RAILROAD STATION COGNITION
EAST LANSING TRAIN STATION

By

Wan-Chu Lin

A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

Environmental Design--Master of Arts

2013

ABSTRACT

RAILROAD STATION COGNITION
EAST LANSING TRAIN STATION

By

Wan-Chu Lin

Planners and designers are interested in understanding place cognition, meaning how does one know where they are in the environment? For example this occurs upon arrival at a train station, where the visitor has never been to that specific train stop before. In this study, the recognition of place is studied for a train station in East Lansing, Michigan.

In this investigation, five design treatments (k=5) for the East the Lansing Train Station are explored. Twelve pictures for each treatment (b=12) were developed from the windows of the train looking into the train station. Forty five respondents separated the pictures into groups associated with the cognition of the place. Through Friedman's Two-Way Analysis of Variance, the results indicated that at least one treatment was different than another treatment ($p \leq 0.005$). The Friedman's Multiple Comparison test revealed that all of the treatments were significantly difference from each other ($p < 0.05$). Treatments with strong symbolism associated with place were more readily identified with a specific setting, the East Lansing Train Station.

Key words: landscape architecture, environmental psychology, environmental design, urban design, transportation planning

DEDICATION

This thesis is dedicated to Li Yueh Chu and Chien Ming Lin

ACKNOWLEDGMENTS

I would like to thank my friends, Bob Yang. Bob Yang gave me some advice concerning public transportation stations, as he is widely traveled.

I would like to thank all of the people who I met and helped me in my life. I apologize that I cannot mention all of your names in my thesis; however, each of you are important to me. Thank you!

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

1.1 Introduction

I am interested in this study because I worked for Jones Lang LaSalle in Taiwan about two years after I had received my bachelor in landscape architecture. I worked upon the Taiwan High Speed Railroad stations and surrounding areas development, planning, and design project. This was one of the largest public projects in Taiwan.

Figure 1.1 Taiwan High Speed Railroad Hsinchu Station. For interpretation of the references to color in this and all other figures, the reader is referred to the electronic version of this thesis. (Copyright © 2012 Pei-Wen Chen, all rights reserved, used by permission)

Figure 1.2 Taiwan High Speed Railroad Taichung Station (Copyright © 2012 Yen-Ching Tseng, all rights reserved, used by permission)
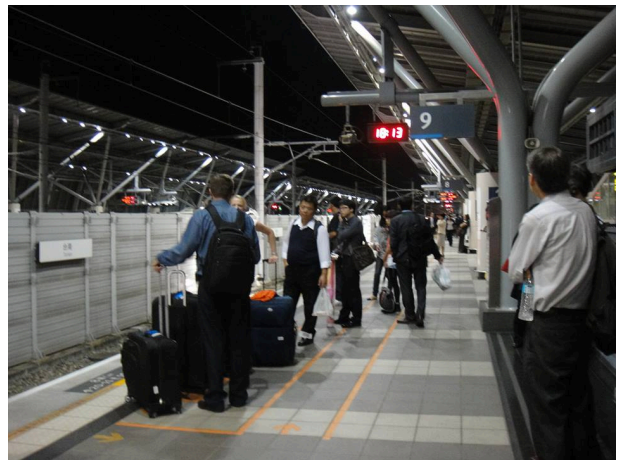
Figure 1.3 Taiwan High Speed Railroad Tainan Station (Copyright © 2012 Yen-Ching Tseng, all rights reserved, used by permission)

At that time, there were many passengers who complained that they disembarked the trains at the wrong stations that made them anxiety and wasted their treasure time. I noticed that the Taiwan High Speed Railroad stations were designed in similar styles confusing passengers. In figures 1.1, 1.2, and 1.3, illustrate problems at the Taiwan High Speed Railroad, but the arrival cognition of them are similar (meaning they look the same).

When people examine topics in public transportation, place cognition is seldom investigated. Often the emphasis is upon alignment, cost, speed, and efficiency. Governments are concerned about the routes and the stations' locations, providing efficient service. In environmental psychology and the planning/design sciences, environmental cognition is one of the principle issues. Environmental cognition influences people's impressions, memories of a place, and affects wayfinding. For example, in railway stations, first time visitors can disembark at the wrong station or be lost. Providing identity to places may alleviate these issues.

1.2 Case Study

I decided to study some existing train stations from around the world and visit some of them first for my investigation, because they can teach me something firsthand about train station design and then make me consider a more comprehensive approach when I am going to create the new designs for the East Lansing Train Station. I will follow the advantages of these existing stations and avoid the disadvantages of them. I will study three stations in the Europe, three stations in the Asia, and one station in the United States. Each station has its own features because each country has different characteristics, cultures, etc.

<u>1.2a King's Cross Station, London, UK</u>

On March nineteenth, 2012, a remodeled London King's Cross Station opened. Network Rail prepared a £500 million restoration plan, and then Camden London Borough Council approved this plan in 2007. Restoration and deglazing the arched roof were included into this plan. An air-open plaza replaced the cramped and congested 1972 extension at this station. The concourse was separated into departure and arrival. Departure passengers were directed to the new concourse, and arrival passengers were directed to the old concourse. This facilitated passenger flow and service. In figure 1.4, people can experience the new arched roof which is the longest single-span station structure in the Europe (Long, 2012; Network Rail, 2011).

Figure 1.4 King's Cross Station, London, UK (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

There are four companies that provide service for the main line and 17 bus lines pass this station. The transportation system is very convenient at King's Cross Station (Network Rail, 2011).

1.2b Tokyo Station, Tokyo, Japan

Tokyo station is a railway station in the Marunouchi business district of Chiyoda, Tokyo, Japan near the Imperial Palace grounds and the Ginza commercial district. In figure 1.5, the image illustrates the Tokyo station which is composed of two buildings. One of them is a three-floor building, the other one is a twelve-floor building. They were built in different times. The three-story building opened in 1914 which applied Renaissance style, red brick, and an octagonal-shaped roof.

Figure 1.5 Tokyo Train Station, Tokyo, Japan (Copyright © 2012 Tian-Wei Feng, all rights reserved, used by permission)

The central portion of the building features a triangular trapezoidal roof which is three stories high. The rest of the building is two floors high. Tokyo is a highly developed city (Fujimori, 1997; Hiroko, 2012). Tourists view Tokyo as a fashionable and highly modernistic city. However, this station does not present any modern element. This station plays an important role in the transportation system in Tokyo, providing services with 17 lines (JR, 2013).

1.2c Longshan Temple MRT Station, Taipei, Taiwan, R.O.C.

Figure 1.6 Longshan Temple, Taipei, Taiwan (Copyright © 2013 Li-Yueh Chu, all rights reserved, used by permission)

Longshan Temple was built in 1738. It was severely damaged by an earthquake during the Chin Dynasty- Cha Chin, and was subsequently repaired. It was damaged again by typhoon in 1867, and then was rebuilt after the typhoon. The style of Longshan Temple was similar to

another temple in Taichung. In Taiwan under Japanese rule, it was a school and military camp. In 1919, people saw that the temple was derelict, and then they rebuilt it, which shaped today's Longshan Temple. It was totally destroyed by World War II in 1945. After World War II, Taiwanese government rebuilt the temple. The Ministry of the Interior arranged Longshan Temple as the Second National Monument. Longshan Temple plays an important role in old Taipei City (Yu, 2008; Wang & Li, 2002). Therefore, Taipei City Government planned to build a Mass Rapid Transit (MRT) station near Longshan Temple Station to resolve local traffic problems and service many more passengers. Longshan Temple attracts lots of tourism, especially Japanese tourism. The station was opened in 1999 (Cheng, 2010). Architects and landscape architects applied the temple's features when they designed the station. Architectural elements and arrangement of buildings as well as a garden have features reminiscent of Longshan temple, which was constructed using a traditional Chinese building style. They also presented the history of Longshan Temple on the ground to inform people about the history of Longshan Temple. Many elements throughout the station and its grounds make an effort to connect the Longshan Temple to the station. Longshan Temple Station is one of the largest MRT station in Taipei (Department of Information Technology, 2009; Taipei Longshang Temple, 2013).

The Longshan Temple MRT station is also connected to the Wanhua Train Station through a five-minute walk. This connection allows Taipei riders serviced by the Longshan Temple MRT with the region, Wanhua Train Station that services all of Taiwan. There are a considerable number of bus lines connected to other districts in Taipei City and New Taipei City. The public transportation connection of this station is convenient and user friendly (Metro Taipei, 2013).

Washington DC. Union Station opened in 1908 and was designed by Daniel H. Burnham in the monumental Beaux-Arts style which is showed in figure 1.7. This style is related to other monumental buildings and museum in Washington DC. Union Station's arches symbolize its primary function as a gateway. Today, this station not only provides transportation, but also restaurants, shops and exhibits. The grandeur of the station represented in the station reflects the image of the nation's capitol (Amtrak, 2008; Union Station Washington D.C., 2013). In the next fifteen to twenty years, Union Station will be redesigned and reconstructed to service more passengers with better quality (Caro, 2012).

Figure 1.7 Washington DC Train Station, USA (Copyright © 2008 Wan-Chu Lin, all rights reserved, used by permission)

1.2e Gare de Paris-Nord, Paris, France

Gare du Nord located at Northern Paris, is one of the seven original stations of French National Railway. It contains many different kinds of public transportation. There are more than

1.8 billion passengers who travel by this station per year. This makes Gare du Nord is the busiest station in the Europe and the third busy station in the world (Rocketnews24, 2013).

Gare du Nord opened in 1854. There were only two rail road platforms when it was first established. Within the progress of the times and the passenger numbers increasing, French National Railways built more railroad lines to continually to satisfied passengers' needs. There are more than thirty railroads platforms, making Gare du Nord the largest station in the Europe (Ka Liye & Briere).

In architecture, the designer Jacques Hittorf modified the initial sketch. He created the building design in a neo-classical style and made the station building in a "U" shape. In design, it was majestic; however, it limited the possibility of expansion that may have influenced the future development of the station (Collectif, 2013).

1.2f Oriente Station, Lisbon, Portugal

Oriente Station was design by Santiago Calatrava and completed in 1998 (Abache, 2001). Serving travelers for the World Expo in 1998 was the first goal by the city of Lisbon. The city of Lisbon also planned the future for Oriente Station to serve more passengers. It made this station as the main station of the whole city. The connection between this Oriente Station and other transportation is really convenient. There are metropolitan, long- and medium-haul regional and international trains travel passenger to their destinations. People can also transfer to other places by buses and taxis. There are three levels to the Oriente Station. The upper level services the national train network, the middle level is arranged as Expo entrance and bus terminal, and the underground is a subway. In figure 1.8, shows the roof of the platform, a twenty-five meters high structure that makes a deep impression upon passengers. The problem of the design of this

station is the ticketing locations which were arranged all over the station rather then a central office. This is the cultural difference between architects and society (Abache, 2001).

Figure 1.8 Oriente Station, Lisbon, Portugal (Copyright © 2010 Jon B. Burley, all rights reserved, used by permission)

1.2g Shanghai South Railway Station, Shanghai, China

In 1908, Shanghai South Railway Station was established originally which was the terminus of the Shanghai-Hangzhou railway line. In 2006, AREP, ECADI, and MaP3 cooperated to redesign and reconstruct Shanghai South Railway Station. This station is the first circular train station in the world (Brooks, 2011). Although, this design was creative, amazing and unique, it ignored passengers' orientation. Therefore, it employed much more workers to direct passengers.

It will cost a lot in the long term (China Daily, 2011). After the Shanghai South Railway Station renewal project was completed, Shanghai West Railway Station in Putuo District and Meilong Station near Jinjiang Park were closed. The new design of Shanghai South Railway Station can service up to 40% more passengers (Brooks, 2011).

Figure 1.9 Shanghai South Railway Station, Shanghai, China (Copyright © 2013 Zheng Chen, all rights reserved, used by permission)

1.3 Literature Review

After I studied these existing train stations around the world, I also examined the current literature. In my opinion, academic articles can also teach me much which relates to train station design that will help me to create designs for East Lansing Train Station with reliable and reasonable ideas. First of all, I will focus on identity and environmental cognition, because the principal purpose of my study is making stations with clear identity can make passengers

understand where they are. Second, I will focus on wayfinding systems. Last but not least, I will address Transit-Oriented Development (TOD). This is an approach to study the surrounding areas of the train station with more benefits. This research is not related to station cognition directly; however, it can still instruct me concerning the surrounding environment of the train station. The Lansing government also applied Transit-Oriented Development approaches towards develop in Lansing (Capital Area Transportation Authority, 2011).

1.3a Identity

"Identity" is the condition or character of a person or a thing. Identity is related to culture, which can make one understand ourselves. Language, traditions, beliefs, morals, laws, social behavior and the art of a community are some of the components of culture. It is imperative in preventing an identity cultural crisis and rootlessness. Understanding culture is a prerequisite for effectively creating identities and communications (Peters, 2005).

In many cases, top companies spend large portions of their budgets creating their own identities, because they understand that identity brings many benefits (Peters, 2005). Professional designers create specific identities for these companies, thus helping companies realize the benefits associated with establishing an identity. These companies also create their own enterprise culture, which is related to identity, to enrich properties and serve society (Peters, 2005).

When people discuss identity, they often focus on people or companies. However, the environment can be created or designed with identities. When people create a new landscape for a place, they can apply the history and use a tradition/ culture, applied to the landscape design creating identity. History is an important role of creating identity. It is easy to create a particular landscape form by applying historic elements; however, planners or designers should also

11

consider the connection between history elements and current people's needs. Keeping balance between historical elements and contemporary needs creates a design that links the landscape to culture in which it serves (Hauser, 2005; Raagmaa, 2002). Sometimes a place has obvious cultural characteristics. Preserving heritages does not only tell new generations about the past but also creates a place with specific identity (Menenti, 2011).

Symbolic elements within the landscape can evoke memories and relate people values to the landscape to create a sense of place. This sense of place connects people to the place, making an intimate, personalized experience (Hull IV, Lamb, & Vigo. 1993).

Ujang (2009) argues that the identity of a place is formed through positive perceptions of satisfaction, enjoyment, and security. This positive perception produces an emotional response that strengthens the connection to and continuity of the place's identity. Conversely, this emotional attachment can be hindered by unpleasant interactions with a place. Such interactions should be avoided by appropriately designing spaces to suit the physical and cultural needs of a site. Physical elements as well as intensity of activity can effect users' attachments to a site as they generate emotional responses. It is therefore important to create continuity within the site's physical, social and psychological dimensions to create a true sense of place. Nogue &Vicente (2004), Carmona (2003), Young & Light (2001), and Lynch (1998) are also interested in environment/ landscape/ place identity.

In station identity, station plaza is seen as a leftover place often; however it is one of the most important parts of station which can define the character of the station. Creating station plaza with its own identity and making it as an accessible place which provides different activities that can promote the station more valuable (PB's PlaceMakign Group, 2011).

<u>1.3b Environmental Cognition</u>

People are always experiencing the environment by watching, hearing or smelling; however, they often ignore that they are also experiencing it emotionally (Bell *et al.*, 2001). People obtain the facts and ideas from the world around them, they remember their emotional responses to the environment from experience. People can make plans and understand the environment by this experience. For investigators, this is environmental cognition (Bell *et al.*, 2001).

In environmental cognition, the experience of getting lost is one of the most important research topics. People often rely on others or technologies when they are looking for their destinations. Visitors feel nervous and stressed when they are truly lost, because the architecture and natural environment may be disorienting (e.g., Cohen *et al.*, 1996: Hunt, 1984). For some people, this kind of negative experience might affect their whole life (Heth & Cornell, 1998; Hunt, 1984).

There is a large percentage of people who share the same experience of getting lost (Bell *et al.*, 2001). When people visit some areas with unsafe condition, being lost might be dangerous. For lost people it is easier for people to find their way back through landmarks and unique buildings. "Simply being more comprehensible may make environments more aesthetically pleasing" (Bell *et al.*, 2001).

Although, maps and charts are useful tools for telling people directional information, people typically travel through a familiar environment without these aids. Cognition maps are the kind of maps are created by people who experience their familiar environment; therefore, these maps are individual. People usually use cognition maps instead of a physical map when they are traveling familiar places that is supported by psychologists (Bell et al., 2001; Lynch, 1960).

In describing and analyzing cognition maps, paths, edges, districts, nodes, and landmarks are the five majority elements which were established by Lynch (1960). Paths such as streets, walkways, or riverways are travel corridors. Edges such as, walls or seashores which defines the ranges, is the second element. Districts such as a Chinatown are defined areas. Nodes are created at the intersections of paths. Moreover, the path's terminus or paths are broken to create nodes, such as a downtown square or traffic circle for example. Last but not least, landmarks are significant features. They always are created large so that people can see them from some distance, such as towers or tall buildings in cities (Lynch, 1960).

Davies & Uttal (2007), Foo *et al.* (2005), and Golledge & Go¨ rling (2004) are also interested in cognitive maps. The knowledge of the relationship between people's behavior and cognition maps helps planners and designers to create a more livable environment.

There are some differences between physical maps and cognitive maps; however, the principle target of them is to facilitate wayfinding. People know how to get to the destinations they want efficiently, such as schools, offices, restaurants, stations, etc. by successful wayfinding system (Evans, 1980; Downs & Stea, 1977). Environments with particular characteristics such as, special architecture, towers, or landmarks, influences the efficiency of people finding their way. Efficient wayfinding can not only save time but also make people feel more pleasant (Garling & Evans, 1991).

There are other researchers who have investigated environmental cognition, such as Henry & Dietz (2012). Their studies give assistant for planners and designers when they are conducting their projects.

1.3c Wayfinding

Wayfinding is one of the most studied issues in environmental cognition. There are some research investigators who study in the relationship between environmental information and wayfinding. There are many different tools which can be assessed to support wayfinding systems such as signs, maps, words, buildings, and landmarks. The environmental evaluations are always impacted by the physical features of settings (Passini, 1992).

In people's daily life, wayfinding plays an important role. One can see wayfinding systems everywhere, such as in the airports, train stations, shopping malls, campuses, etc. Ideal wayfinding systems provide information utility to people concerning direction; however, unsuccessful wayfinding systems confuse people. The aim of wayfinding is assisting people to spend less time and less effort to arrive at their destinations (Brunye ́, Mahoney, Gardony, & Taylor, 2010; Fewings, 2001).

Signage is always correlated to wayfinding. For instance, signs are always one of the important elements of wayfinding. People understand signs which tell them what is where, when is the event, etc. In wayfinding, signs tell people the direction that leads people to their destinations (Passini, 1992). There is less ambiguity from signs offering the services of communicating direction and providing environmental information. Directional, identification, and reassurance are the three basic forms of signs that direct, inform, control and identify (Apelt, 2008; Fewings, 2001). Currently, people who live in a busy life style, are often in hurry, especially when traveling. Therefore, wayfinding is really important in transportation stations. People spend less time as possible of reading sings, sometimes they just give a glimpse. Signs should be created and designed in simple and easily

understandable manner that makes people know where to visit and how to get there in the shortest time. Abundant and complex information has been shown to make people become confused (Passini, 1992). More over, wayfinding systems should be designed and created as a comprehensive family. For instance, it not only provides the primary information, but also secondary information that guides people where they can visit and how to get there easily (The Wayfinding Handbook, 2009).

Numerous people have the experience of getting lost after they read the sign. People are educated to trust or distrust the signs by their experience of interacting with signs to provide correct or incorrect information. Therefore, designers should make signs that are reliable and with the quality that is necessary so that people will trust the wayfinding system (Passini, 1992).

Calori (2007), Smitshuijzen (2007), and Arthur & Passini (1992) are also interested in and investigated wayfinding and signage. They understand that successful wayfinding system especially in signage help people to find directions.

After reading maps, many people have experienced confusion concerning where they are located. This is a common situation, because it is difficult for people to transfer the map's information to real space (Butler, Acquino, Hissong, &Scott, 1993; Levine, 1982; Thorndyke & Hayes-Roth, 1982). This has led to the "You-Are-Here Maps" to help orient people (Levine, 1982; Levine, Marchon, & Hanley, 1984).

Although, maps and signs are the principle elements in a wayfinding system, successful spatial design is important in a successful wayfinding system. This is especially important for people who are disabled visually or cannot read. When a person is engaged in finding one's way, one should rely on some information tools, such as signs and maps,

but also environmental information, such as buildings characteristics and landmarks. Therefore, environment elements are as important as signs in way-finding system (Passini, 1992).

There are some other professionals who have investigated wayfinding systems. They discuss wayfinding systems not only in signs but also in spaces (Hidayetoglu, M., Yildirim, K., & Akalin, A., 2012; Hochmair, H., & Karlsson, V., 2005; Kato, Y., & Takeuchi, Y., 2003).

Moreover, there are issues concerning wayfinding at stations. The wayfinding system at stations aim to make passengers with less stress, promote passengers' satisfaction, control the passenger flow, lower crowding of station, make passengers get to the trains on time, and reduce the risk of choosing wrong trains (Rail Safety & Standards Board, 2006). Comprehending the stations users is the first of creating station wayfing systems, and then makes the wayfinding systems with high quality to satisfy users requirements. There is static and temporary information that stations should inform passengers. Statistically, the signage approach is almost always applied. For temporary information, location is the first issue that should be addressed. The appropriate place to set the temporary information can inform important information to passengers efficiently (Rail Safety & Standards Board, 2006). Lighting is another principle tool of wayfinding at stations. There are different standards of lux minimums at the different places at the stations. For example, the minimum lux is 200 for directional wayfinding. Otherwise, the color of the lighting should also be considered either. Yellow artificial light should always be avoided in wayfinding (Rail Safety & Standards Board, 2006).

<u>1.3d Transit Oriented Development</u>

Planning and design professionals consider transit-oriented development (TOD) when working on project. TOD explores mix-land use, economic promotion, and affordable housing to satisfies people's needs and expectations (Dittmar & Ohland, 2003). The differences between people live in a community with TOD and traditional development are people prefer to walk instead of driving, the utility of public transportation is promoted, and the number of how many cars per person owns is reduced (PB's PlaceMakign Group, 2011). That is why many planners who apply TOD when they conduct new or renewal projects.

When starting a project, professionals investigate TOD. They focus upon the walking distance, within a half-mile, between the residential areas and the transportation stations. Walking distance is a consistent feature investigators study (Center for Transit-Oriented Development, 2011).

The principle target of transportation is taking people to wherever they want to go. Transportation offers the physical access to reach goods, services, activities, and destinations (Litman, 2012). There are five principle goals that planners should refer when exploring transit-oriented development: location efficiency, rich mix of choices, value capture, place making, and resolution of the tension between node and place (Dittmar & Ohland, 2003). Station always plays the role as a core to a district. A district is planned with multi-zones that makes it more attractive The surrounding areas of a station should be planned and designed organized that can promote the value and utility of this station (PB's PlaceMakign Group, 2011).

Visual pleasing, lively, and walkable communities, multi housing, shopping and transportation, economic benefits, regional employment, education, government centers, hospitals, entertainment accessibility are some of the advantages of successful TOD (City and

County of Denver, 2006). Ratner & Goetz (2013), Curtis *et al.* (2009)*,* Arrington & Cervero (2008), and Gau & Lin (2006) are also interested in transit-oriented development.

1.4 Intent of Study

At the beginning of my master study, I was interested in the public transportation station design, because I thought public transportation station is an indispensible facility in people's daily life. When people travel long distances, they must have to rely on public transportation, such as, aircrafts, trains and boats. Passengers departure or arrive at the public transportation station, the experience is important to people.

After reading articles, journals books, some of them mentioned about the importance of environmental cognition which concerns the relationship between people's behavior and environment. They discuss the environment at a large scale, such as a city or a county setting. They seldom mention about the environmental at a small scale, such as a station or a single building.

In transportation station planning and design, people discuss the station's location and the functions of a station. In addition, many researchers study wayfinding systems and transit oriented development. However, they seem to ignore the importance of the station arrival cognition. Therefore, I wish to explore issue related to the arrival identity of public transportation station in this thesis.

I wish to explore the level at which passengers at the East Lansing Train Station can identify where they are through visual cues. My hypothesis is that there is a visual level at which passengers can recognize where they are upon arrival. I wish to discover which treatment facilitates arrival cognition. I propose to study various designs for the station from relatively

uninformative treatments to quite blatant design treatments to determine the threshold upon

which passengers have strong arrival cognition.

CHAPTER 2

2.1 Methodology

To test the ability of respondents to determine the level of arrival cognition, I designed five treatments for the East Lansing Train Station. For each treatment, there are twelve window views that are from inside the train. These views are the first views for passengers when they arrive.

2.2 Study Area

In figure 2.1, the red triangle area presents the current East Lansing Train Station's location. People can also understand the condition of the surrounding areas.

Figure 2.1 The red triangle is the exist location of East Lansing Train Station: 1240 South Harrison Road, East Lansing, MI 48823, US. (Imagery Copyright © 2013 Cnes/Spot Image, DigitalGlobe, Landsat, U.S. Geological Survey, USDA Farm Service Agency, TerraMetrics, all rights reserved, used by permission, Copyright © 2013 Google, all rights reserved, used by permission)

Figure 2.2 shows the current condition of the East Lansing Train Station. There is only a tiny station building and the outside parking lot. There are other buildings which are the storage of Michigan State University.

Figure 2.2 Aerial of the existing East Lansing Train Station (Imagery Copyright © 2013 Cnes/Spot Image, DigitalGlobe, Landsat, U.S. Geological Survey, USDA Farm Service Agency, TerraMetrics, all rights reserved, used by permission, Copyright © 2013 Google, all rights reserved, used by permission)
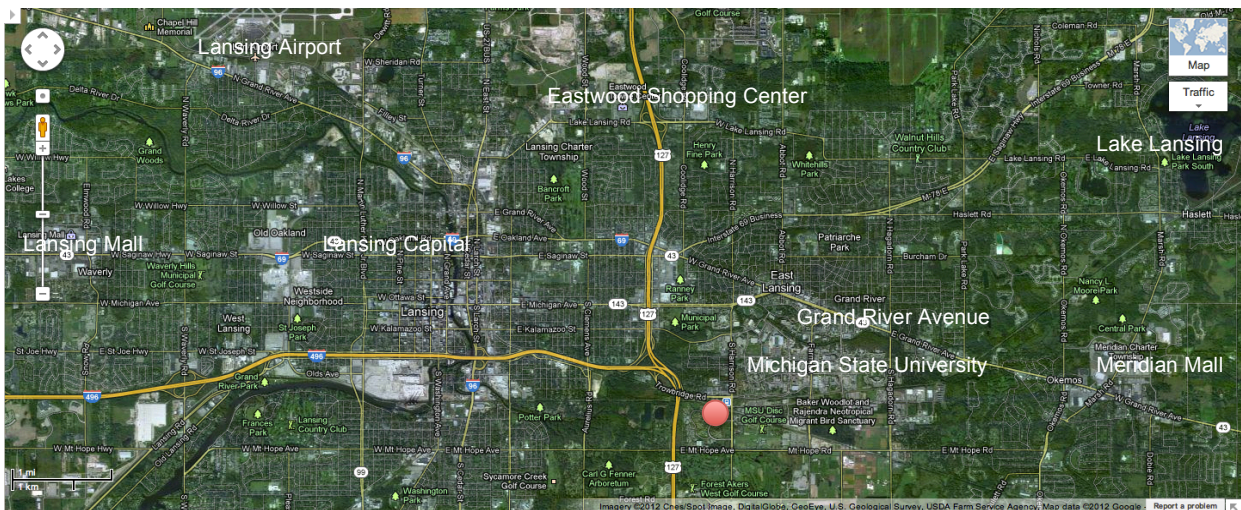
Figure 2.3 The connection between East Lansing Train Station and other destinations (Imagery Copyright © 2013 Cnes/Spot Image, DigitalGlobe, Landsat, U.S. Geological Survey, USDA Farm Service Agency, TerraMetrics, all rights reserved, used by permission, Copyright © 2013 Google, all rights reserved, used by permission)

Figure 2.3 show the relationship between the East Lansing Train Station and the destinations in East Lansing and Lansing area that can give visitors some idea where they can visit.

2.2a The Past and Future of East Lansing

When the Chicago-Toronto train, the International, was reinstated, Amtrak needed a station in Lansing (Winkle, 2003). The old Grand Trunk Station in Lansing was not an option as it had already been sold and turned into a restaurant. Michigan State University in nearby East Lansing, allowed Amtrak to establish a station in a university-owned storage building just south of the former Grand Trunk tracks. East Lansing residents benefited from a station on the west edge of campus, and Amtrak installed a new station at minimal cost. However, this station lacks the charm and character of stations from an earlier era, but does provide an indoor waiting room, bathrooms, and is located in a good spot (Winkle, 2003).

The facilities of the exiting East Lansing Train Station are the ticket office, an enclosed waiting area, restrooms, a Quik-Trak kiosk, short-term parking (20), and long-term parking (175). There are dedicated parking, wheelchair lift, wheelchair, waiting room, fountain, and a platform for accessibility. It also provides baggage assistance for passengers. However, there is no lounge, pay phone, ATM, elevator, checked baggage service, baggage storage, lockers, baggage carts, and parking attendant at this station (Amtrak, 2013).

2.2b Image of current East Lansing Train Station

In figure 2.4 and 2.5, these pictures show current condition of East Lansing. The East Lansing Train Station building looks really simple as a one story building. It used to be an MSU storage building (Winkle, 2003). Therefore, the image of this station is poor which does not have any particular characteristics.

23

Figure 2.4 Outside of the current East Lansing Train Station (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Figure 2.5 Inside of the current East Lansing Train Station (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

2.2c The features of East Lansing

There are a number of symbols that represent the study area. The City of East Lansing is represented by a simple sign. Visitors might also understand that trees may play an important role in East Lansing City, but people in the past have harvested lots of trees in the area. Therefore, it is not easy for people to know that East Lansing is a tree city without this sign.

The weather in winter at East Lansing is cold. Snow covers the whole city which makes the city have a northern climate characteristic. Therefore, "white" is another important element in East Lansing. However, many cities in North America are covered with snow during winters.

East Lansing is Michigan State University's home, which is an important part of East Lansing. "Go green, go white" is the slogan of Michigan State University. Green and white not only present trees and the weather, but also present Michigan State University. There are other important elements of Michigan State University," such as the Spartan (Oswald, 2005), football (Grinczel, 2003), and Eli and Edythe Broad Art Museum (Arch Daily, 2012).

Michigan is a lake state which is surrounded by lakes. These lakes make the state of Michigan enjoy a mild climate that is different with the other northern states (Michigan in Brief, 2011). There are the Grand River and the Red Cedar River which run through Lansing and East Lansing area. Grand River is the longest river of the State of Michigan. (National Hydrography Dataset high-resolution flowline data). Red Cedar River runs through Michigan State University which is important to students of Michigan State University (MSU Alumin, 2013). Water is a principle feature of State of Michigan, Lansing, and East Lansing.

Art also plays an important role in Lansing, there is an art festival in May every year. Eli and Edythe Broad Art Museum is a new modern building opened in 2012 (Arch Daily, 2012). It

will attract many visitors in the future. The Art festival and Eli and Edythe Broad Art Museum reflect the positive character of the area.

Oldsmobile cars were founded and produced in Lansing. It was founded in 1897 and disbanded in 2004. Today GM cars are still built in Lansing (Casteele, 1992; Kimes & Langworth 1972).

There are many characteristics for East Lansing representing the local features. These characteristics could be applied in a train station design that may give the station with its own identity, and facilitate passenger arrival cognition.

2.3 Design Treatment

For my research, I developed five different designs on a scale ranging from an ambiguous identity to a site with strong local identity.

2.3a Alternative 1

The principle concept of this design is "simple." Simple does not mean an empty design. The design supplies the common standards for the rail station. There are ticketing areas, an enclosed waiting area, open air waiting areas, platforms, restrooms in the indoor area, and parking outside. This is a disabled friendly station providing accessible facilities.

Figure 2.7 shows the architectural design is a three-story building designed in a traditional redbrick style of the region. The landscape architecture design contains a main plaza with a parking lot. The parking lot can be a weekend market providing the farmers' opportunity to sell their products of. The remaining areas of this site are planted with trees.

Figure 2.6 The site plan of the treatment one. (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)
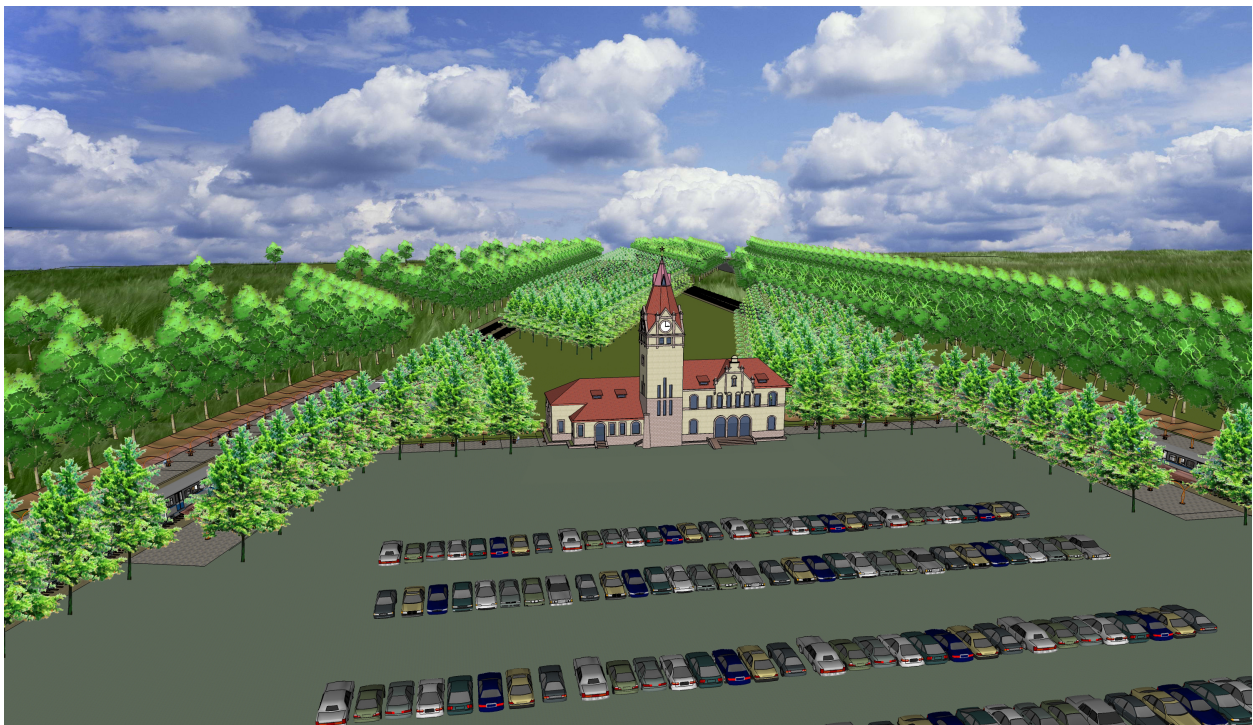
Figure 2.7 The image of the treatment one (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

2.3b Alternative 2

The main idea of this design treatment is modern with multi-functions. The facilities and services supported by this train station are numerous. In the indoor area, there are underground-parking areas and storage in the basement. Ticketing, enclosed waiting areas, platforms, a café, a souvenir store, and restrooms are arranged in first floor. On second floor, there are shopping center, restaurants, Amtrak office, and restrooms. There is a shopping center and luxury hotel lobby on third floor. The luxury hotel rooms are established at fourth floor to eighth floors. There is a luxury restaurant on ninth floor. The roof top is designed with a swimming pool and night club. The outdoor facilities of this station includes are walkway, bikeway, performance stage, fountains, sculptures, café, way-finding system. This is a disabled friendly station.
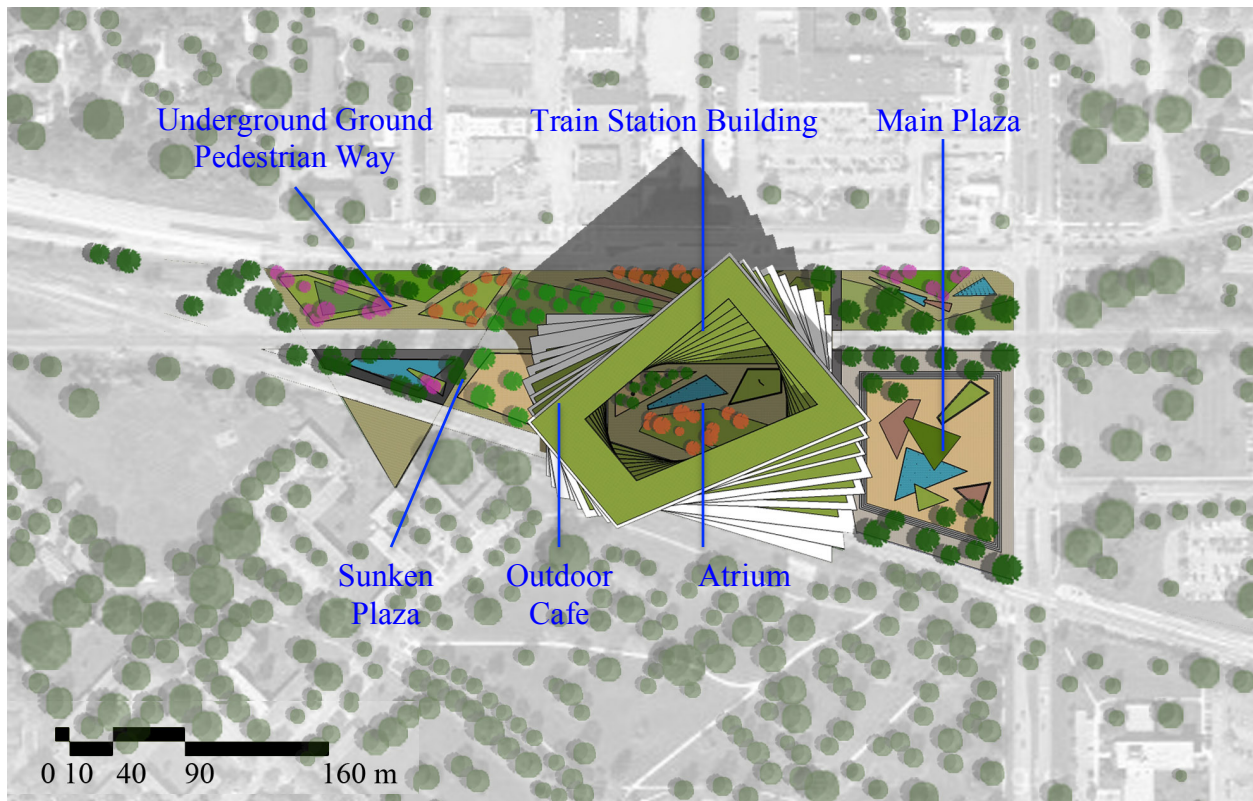
Figure 2.8 The site plan of the treatment two. (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

28

There is a nine-story modern architecture building in the design. Its shape reflects the shape of the site and the railway. This building provides people different services, such as shopping, eating, and drinking. Each floor in this building is angled providing people the opportunity to enjoy different views when they are at different spots at the station. People can enjoy swimming, drinking and dancing at the rooftop which is designed to be a quality night club and lounge bar in Michigan.
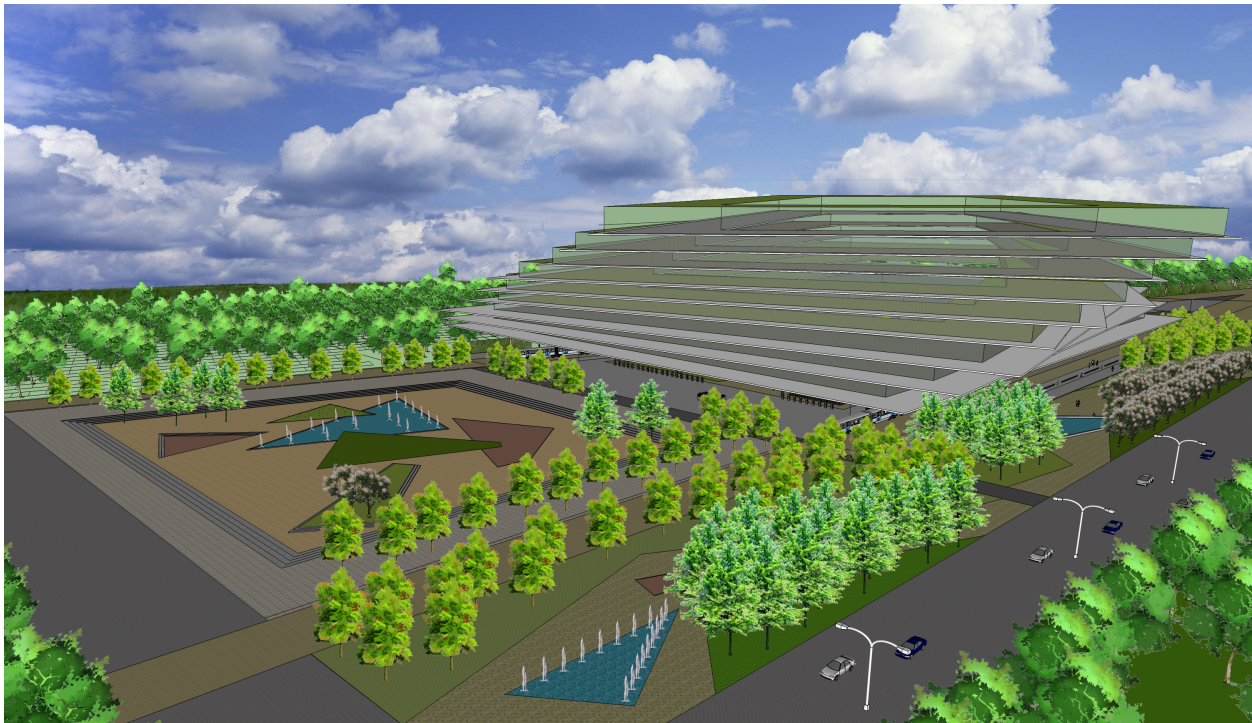
Figure 2.9 The image of the treatment two.

In figure 2.9, the landscape design, contains some fountains around the whole site reflecting the feature that Michigan is a lake state. The shape and the pattern of the main plaza reflect to the shape of the building, the site and the railway. The functions this plaza provides are varied. People can enjoy a fountain performance during the weekday, and then enjoy the outdoor performances during the weekend. It also provides spaces for family activities. This is a vehicle free area that reduces the dangerous and accidents. It is really safe for children to play here. The

29

shape of the plaza which is in the middle of the building also reflects the building and the site. There is an area providing people some information about the Eli and Edythe Broad Art Museum exhibition. The artwork at this pre-museum can be change following the Eli and Edythe Broad Art Museum exhibition schedule. People can enjoy the exhibition and the fountain when they are sitting at the outdoor café is serviced by Biggby which is a local brand of coffee. There is a underground pedestrian way. People can cross the railway enjoying the water walls at the same time. This new station design will be able to make East Lansing with a brand new image that changes people's thinking about that East Lansing.

2.3c Alternative 3
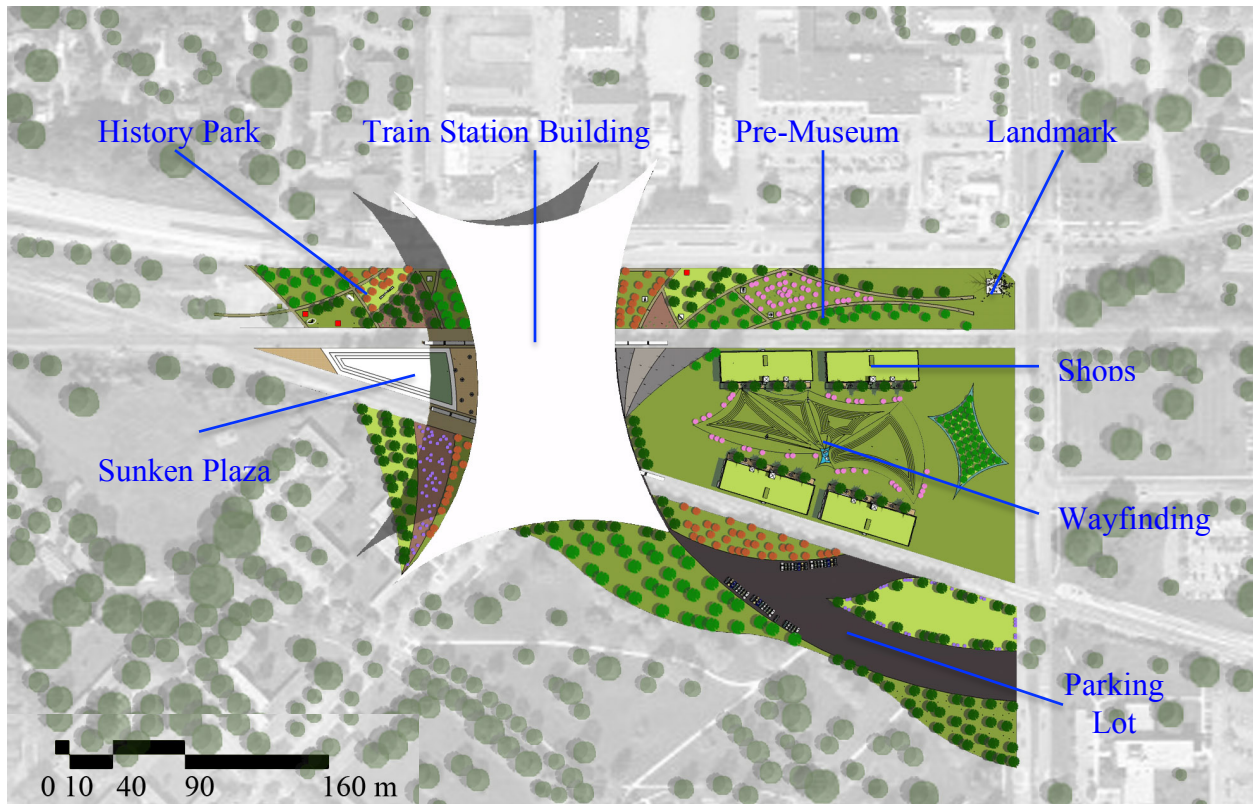
Figure 2.10 The site plan of the treatment three. (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

The concept for this design is "Green and White" reflecting the local identity. In the indoor area, this station provides underground- parking, and storage in the basement. There are

shopping center, restaurants, an Amtrak office, and restrooms at the second floor. The third floor is designed for shopping center, and luxury hotel lobby. The luxury hotel rooms are arranged the fourth floor through the eighth floor. This is a luxury restaurant on the ninth floor. This treatment is also a disabled friendly station.

In figure 2.11, the architectural design, contains one main building and four secondary buildings. This design is inspired by the works of Santiago Calatrava. His works always apply simple color and amazing shape that reflects this design concept "Green and White." The other four three-story buildings are designed in traditional style that does not create visual competition between the main station building and the other buildings.
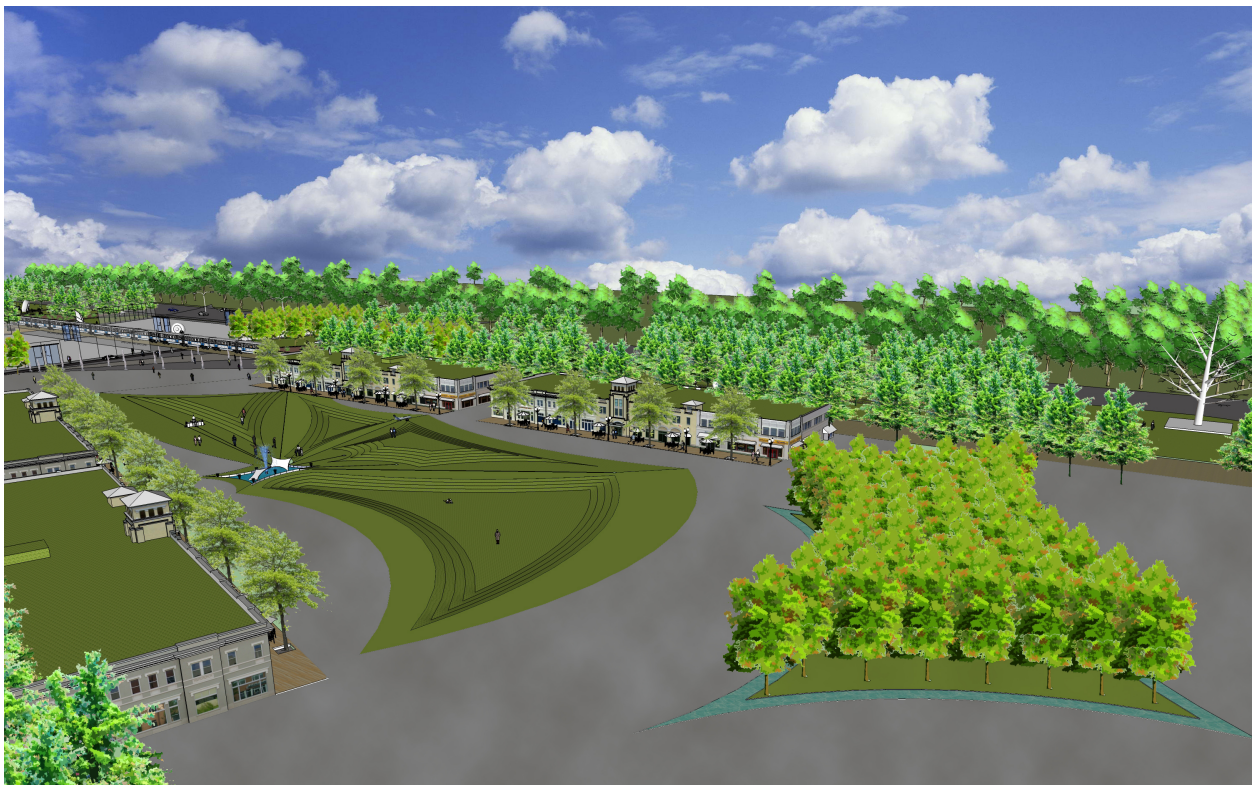
Figure 2.11 The image of the treatment three. (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

The landscape design, contains the pattern around the site reflecting the main building's shape. The main plaza is designed as a physical wayfinding system giving people information and direction to areas in Lansing and East Lansing.

2.3d Alternative 4

The main concept of this design is "East Lansing & Michigan State University." In the basement, there is an underground- plaza, a café, and storage. The first floor is designed for the public with drop off area, ticketing, enclosed waiting area, platform, souvenir store, and restrooms. The second floor through the ninth floor are arranged for residential use. There are walkways, bikeways, a performance stage, fountains, sculptures, a café, and a way-finding system for the outdoor open spaces. This is a disabled friendly station.
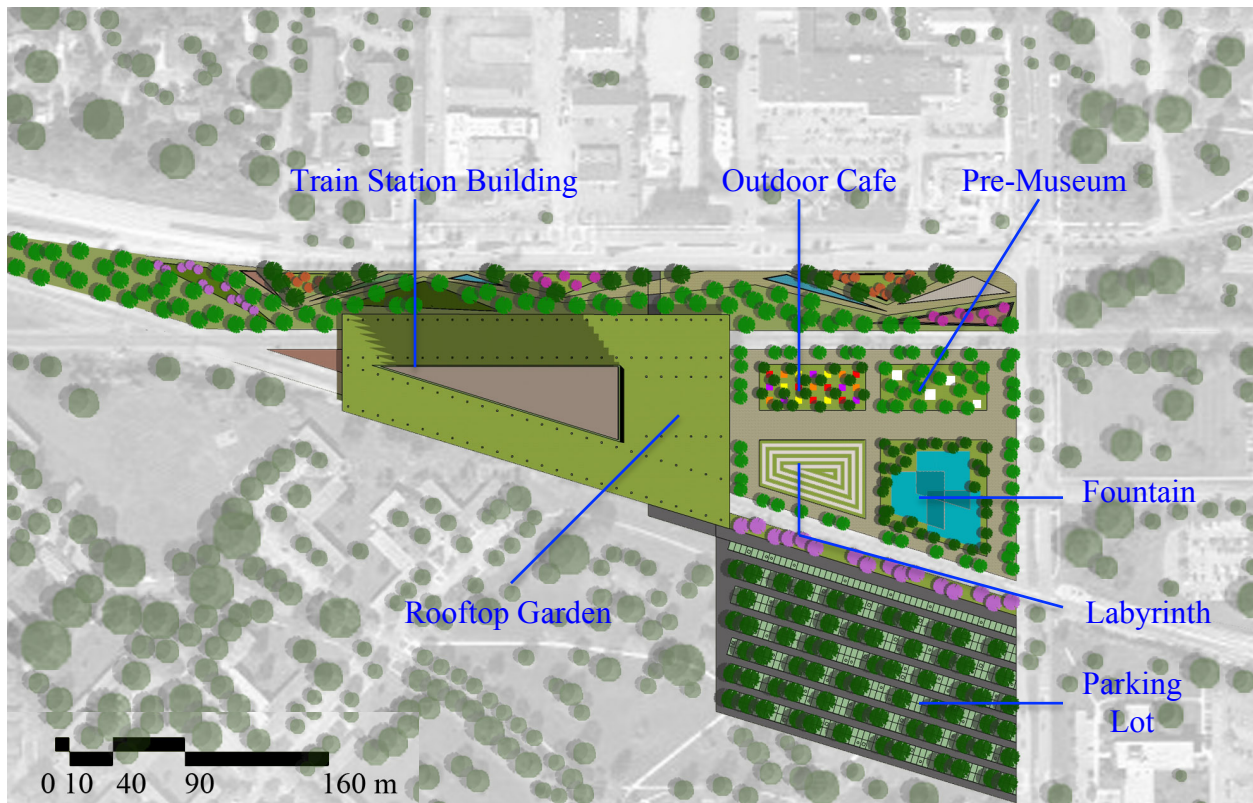
Figure 2.12 The site plan of the treatment four (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

32

In figure 2.13, the architectural design, contains the shape reflecting to the shape of the site and the railway. The colors of the building are green and white reflecting to Michigan State University's slogan "Go Green, Go White" and the features of East Lansing. There is a rooftop garden on the second floor which is also designed in green and white. All of the facilities and furniture of this garden are also designed in green and white. During the winter, this garden can become totally white, and it has green and white colors in other seasons. Underground and the first floor are designed for public and other floors are created for residential. The underground plaza is decorated with Michigan State University features, people can have drinks and enjoy the performances at this plaza. People can see the whole plaza when they are at the first floor. The housing type is suitable for singles who want to live with high quality, because there are so many students and faculties complain about the poor quality of Spartan Village.
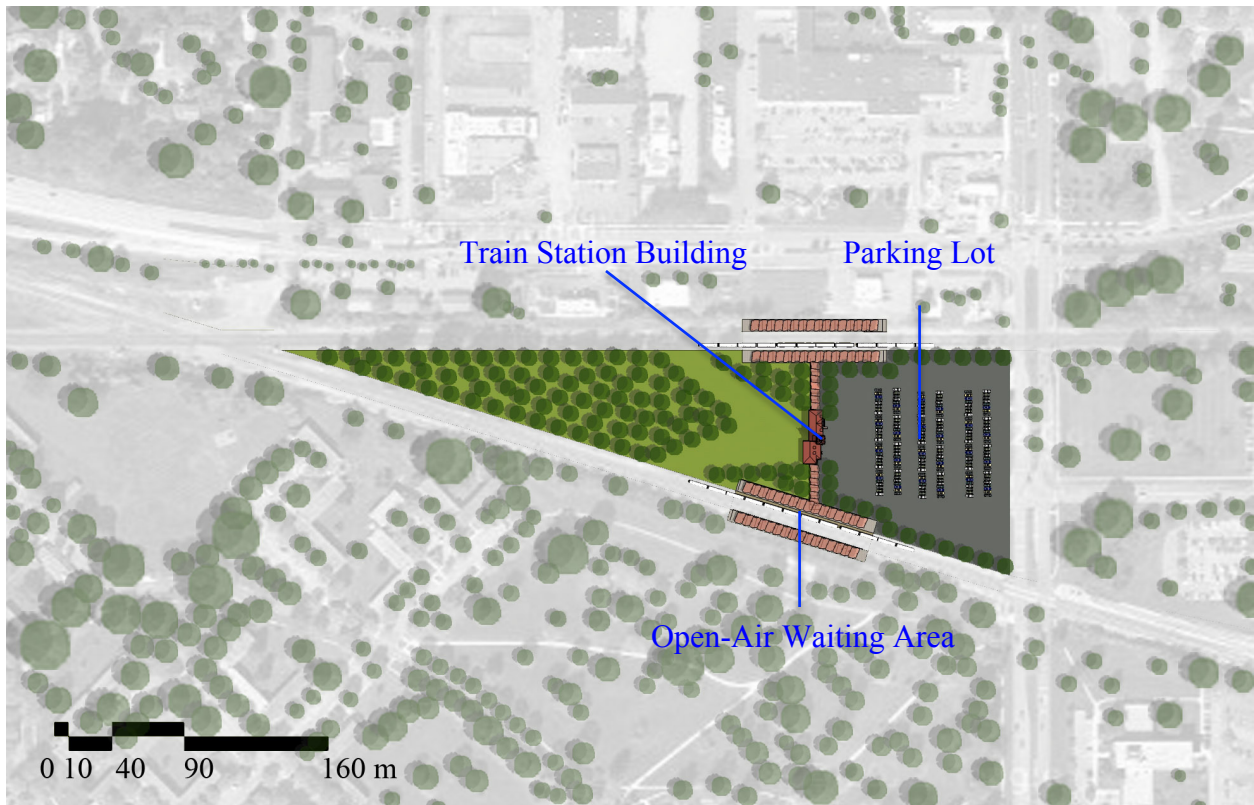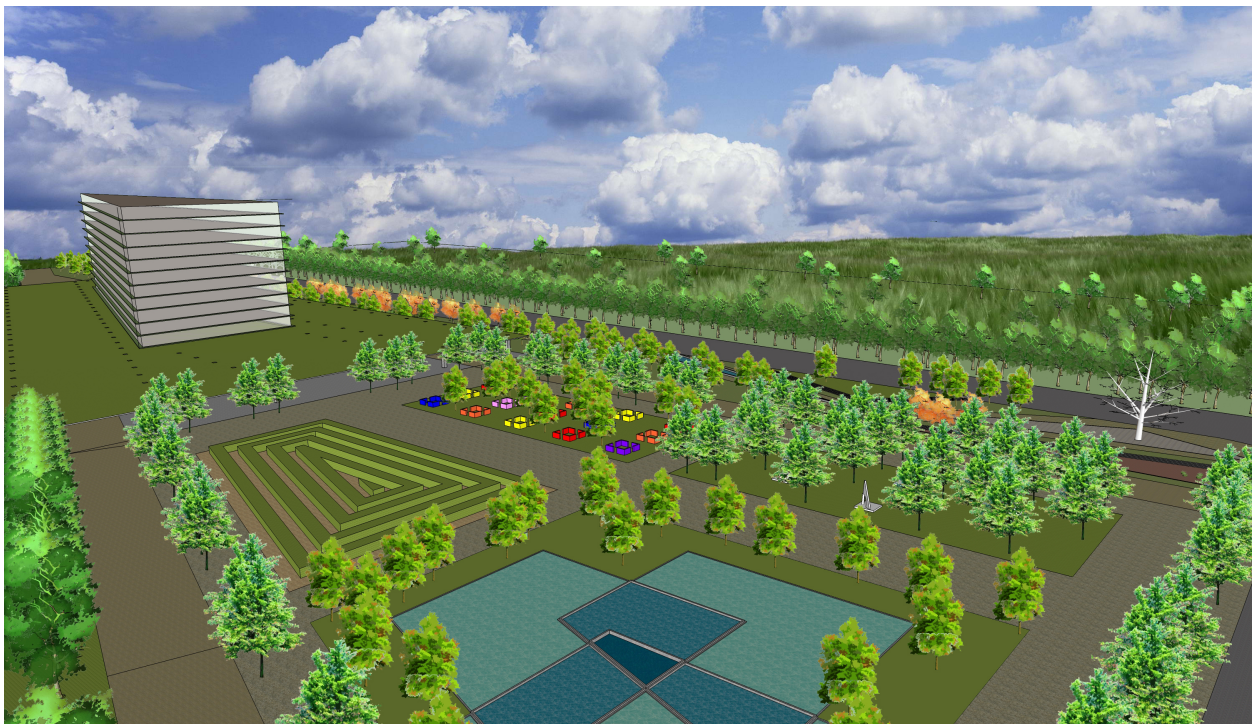

Figure 2.13 The image of the treatment four. (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

In figure 2.13, the landscape design, contains a main plaza, separated into four parts with different functions and characteristics. There is a pre-museum that gives visitors some information about the exhibition at Eli and Edythe Broad Art Museum. The artworks there can be changed when the Eli and Edythe Broad Art Museum change its exhibition topics. A small forest that reflects East Lansing is a tree city is in the design. A labyrinth and a Spartan provides children a play ground. An outdoor café is serviced by Biggby which is a local coffee brand. This plaza is a car free plaza that provides people with a safe space. The rest of the site is created for an Oldsmobile museum, telling people that Lansing was an important car innovator in the car industry.

2.3e Alternative 5
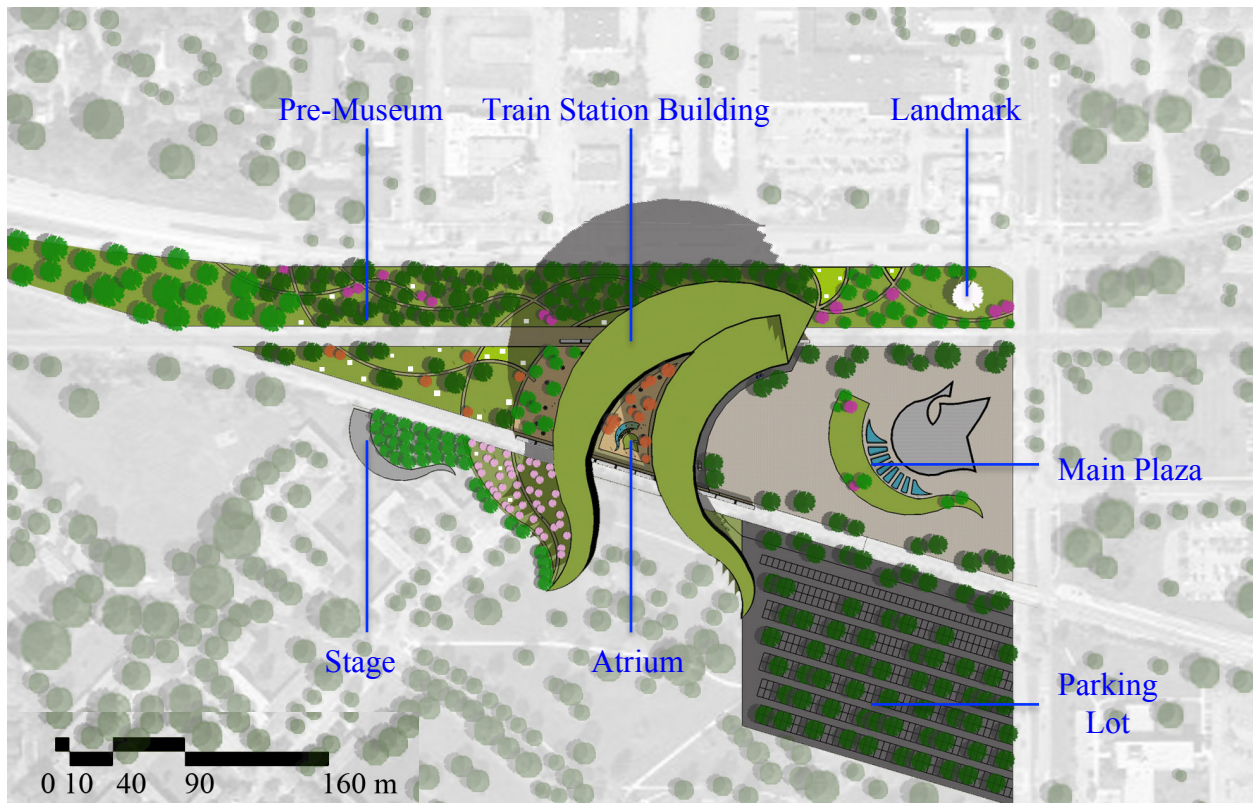
Figure 2.14 The site plan of the treatment five. (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

34

Figure 2.14 illustrates the primary concept of this design, "Michigan State University." The services this station supports are a drop off area, ticketing, enclosed waiting area, platforms, a café, a souvenir store, and restrooms on the first floor of the building A. The second floor of the building B is arranged for restaurants, Amtrak office, and restrooms. There is a shopping center on the third floor to the fifth floor at the building A. The first floor of the building B is designed an enclosed waiting area, a platform, and restrooms. The luxury hotel rooms are on the second floor through the seventh floor at the building B. Building B's eighth floor is designed for a luxury restaurant. There is swimming pool, lounge bar, and the nightclub at the roof top area of the building B. This is a disabled friendly station.
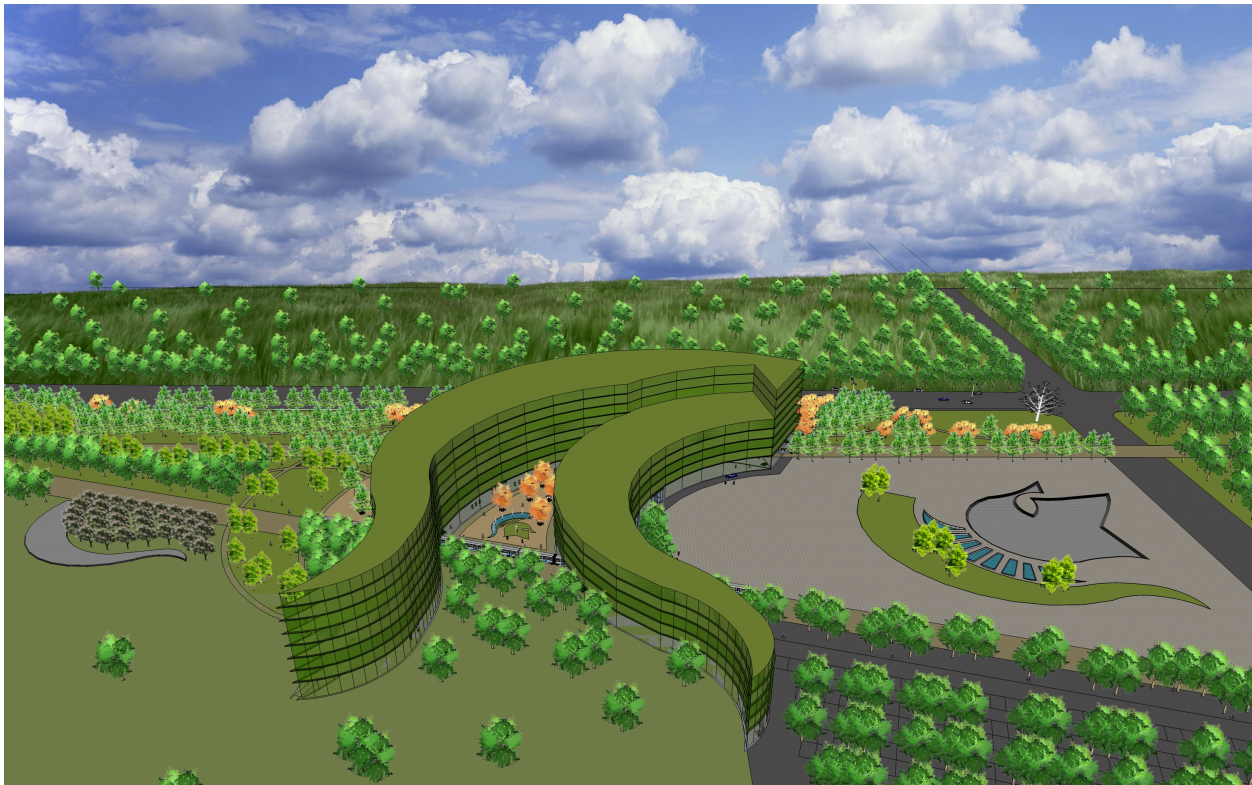
Figure 2.15 The image of the treatment five. (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

In figure 2.15, the architectural design, contains the shape of a building the featuring the Michigan State University Spartan helmet. All of the facilities and furniture inside the building

35

are designed with Michigan State University Spartan features, and the colors of them are only green and white reflect to the Michigan State University's slogan "Go Green, Go White." This building provides people such as shopping, eating, and drinking. People can enjoy swimming, drinking and dancing at the rooftop which is designed as a quality night club and lounge bar in Michigan.

In figure 2.15, the landscape design, is in the shape of Michigan State University Spartan features. There are many Spartan sculptures. The main plaza is decorated with Spartan helmet shape. In fountains and grass provides flexible activity space for performances and a weekend market. The garden between two buildings also has Michigan State University Spartan features. There is a large Spartan sculpture. People can enjoy the outdoor café and fountain performance at this garden.

2.4 Survey

2.4a Survey Picture

AutoCAD 2013 (Autodesk, 2013) was used to prepare site plans for five design treatments, and Sketch Up Pro 8 (Google, 2011) to make the 3D model for each of them. There are six views from east to west from the trains on the northern railroad, and another six views from the southern railroad for each treatment. Finally, Photoshop CS3 (Adobe, 2007) was used to make these pictures more vivid and beautiful to facilitate respondents to understand them easily when they are reading these pictures. These five pictures are the examples from the five design treatments.

Figure 2.16 Treatment one survey picture (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Figure 2.17 Treatment two survey picture (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Figure 2.18 Treatment three survey picture (Copyright © 2012 Wan-Chu Lin, all rights reserved, used by permission)

Figure 2.19 Treatment four survey picture (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Figure 2.20 Treatment five survey picture (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

The survey included forty-five respondents to do the survey. Each respondent examined twelve pictures from each treatment. There are sixty pictures total in this survey. There is only one question in the survey, "Do you know where you are?" There are four answer for respondents to choose are: "unclear, Michigan, East Lansing, Michigan State University." The respondents were to place the pictures in one of four piles. This survey follows the Institutional Review Boards (IRBs) requirements.

2.4c Survey Analysis

Friedman's Test

The Freidman's test is the method for assessing the design treatments. Friedman's Test allows comparisons of more than two treatments or groups, using the ranks. The treatments are represented by letter "k." In addition, there are blocks (b) which represent a set of pictures across the treatments. The results are placed in a table to compare each design treatment. There are two possible outcomes. Each treatment's rank is similar with the other treatments, meaning the result is not significantly different, or each at least one treatment's rank is different from other treatments, meaning the result is significantly different (Daniel, 1978).

There are two hypothesis of the Friedman's Test.

H0: The results of the treatments are all the same.

H1: The results of the treatments are significant different, at least one treatment is significantly different with another treatment.

Test Statistic:

For comparing my five design treatments, the first step is calculating the ranks from the survey result. Before calculating the ranks, the respondents' answers are transformed into numerical scores.

Equation 1:

score = [X×4(MSU)] + [Y×3(East Lansing)] + [Z×2(state of Michigan)] + [W×1(Unclear)]

X, Y, Z, and W are how many respondents' answered MSU, East Lansing, State of Michigan or Unclear when they were doing this survey.

The treatment with the higher scores would have a smaller number in the ranking; conversely, a treatment with lower scores would have a larger ranking. The ranks of each treatment are independent. If the results are similar the H_0 is supported. If the outcomes are different, at least one treatment is significantly different with another, supporting H_1.

The second step is summing the ranks of each treatment to support or reject. When the numbers in each column are close that means H_0 is supported. When the numbers in each column is different, potentially at least one of them is different from another treatment rejects H_0.

Equation 2: The Friedman's two-way analysis of variance by rank formula

$$X_r^2 = \frac{12}{bk(k+1)} \sum_{j=1}^{k} R_j^2 - 3b(k+1)$$

k = numbers of the treatments

b = numbers of the blocks

Decision rule:

The comparison for X_r^2 for significance is calculated by applying the suitable critical

from a table when b and k are small. If the X_r^2 of computed is equal to or larger than the X_r^2 of

listed for b and k, and $\propto = p$, H0 can be rejected at the $\propto$ level of significance. The comparison

for X_r^2 of significance is calculated by applying chi-square when the b and k values are not listed

in the giving table. When the computed X_r^2 is equal to or larger than $X_{(1-\propto)}^2$ of the list value

for $k - 1$ freedom degrees, H0 at the $\propto$ level of significance is rejected.

Ties

Theoretically ties should not happen because the test assumes the ranks are derived from

continuous data.

However, for ties equation 3 calculates the ranks which are adjusted.

Equation 3: Ties formula

$$1 - \sum_{i=1}^{b} T_i / bk(k^2 - 1)$$

Where $T_i = \sum t_i^3 - \sum t_i$ and $t_i =$ the number of observations tied for a given rank in the

ith blocks.

Multiple-comparison procedure for use Friedman test:

When the outcomes of the treatments are predicted to be significantly different that

usually means that the researchers want to understand more about the treatments. They desire to

know the differences between each treatment when H0 is rejected. Therefore, one needs to apply

the multiple-comparison (equation 4).

Equation 4: Multiple-comparison formula

$$\left| R_j - R_{j'} \right| \geq z \sqrt{\frac{bk(k+1)}{6}}$$

Where R_j and $R_{j'}$ are the jth and j'th treatment rank totals, and z is a value from the giving table corresponding to $\propto/k(k-1)$.

CHAPTER 3

3.1 Result

There are twelve pictures each from the five treatments. The table under each picture is the result of respondents' answers.

3.1a Alternative 1 Result

Group	Unclear	MI	EL	MSU
Number	**34**	**9**	**2**	**0**
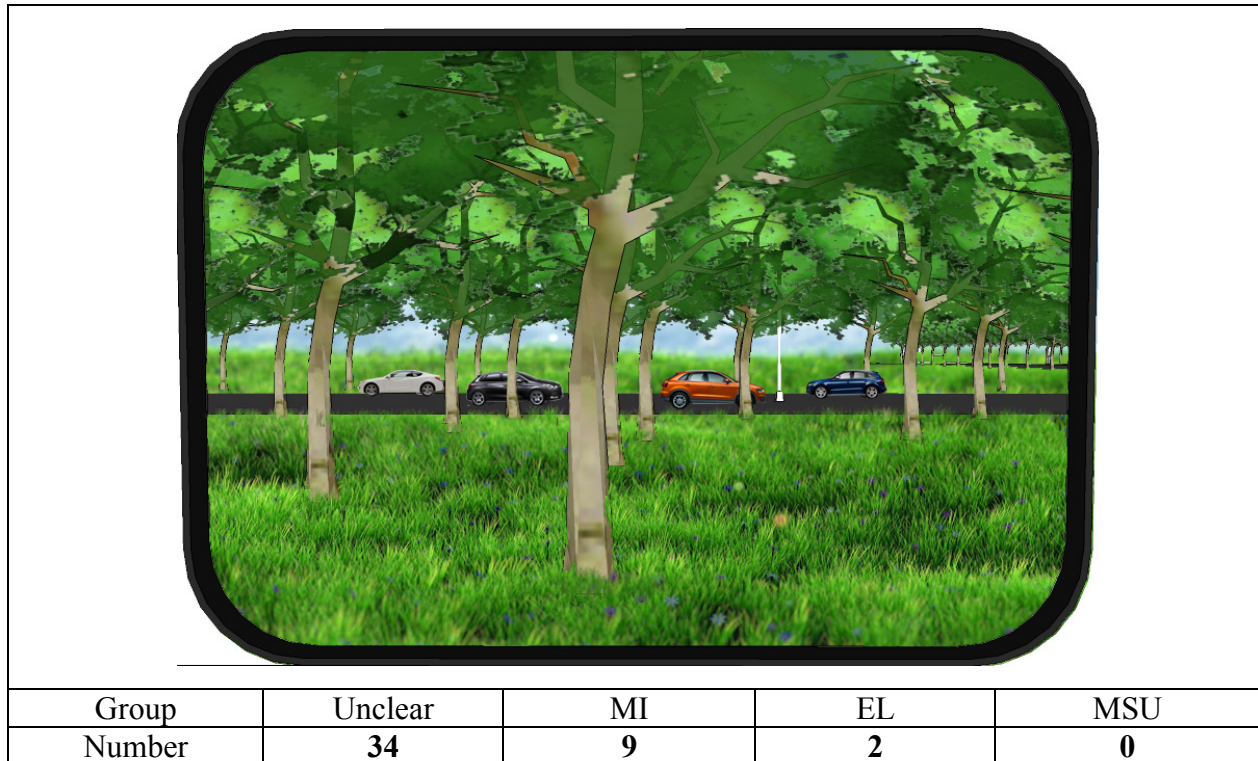
Figure 3.1 Picture 1-01 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**37**	**3**	**3**	**2**

Figure 3.2 Picture 1-02 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**36**	**4**	**3**	**2**

Figure 3.3 Picture 1-03 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission

Group	Unclear	MI	EL	MSU
Number	**30**	**4**	**3**	**8**

Figure 3.4 Picture 1-04 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**29**	**2**	**4**	**10**

Figure 3.5 Picture 1-05 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**31**	**5**	**7**	**2**

Figure 3.6 Picture 1-06 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**33**	**11**	**1**	**0**

Figure 3.7 Picture 1-07 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**34**	**5**	**4**	**2**

Figure 3.8 Picture1-08 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**35**	**4**	**4**	**2**

Figure 3.9 Picture1-09 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**28**	**1**	**7**	**9**

Figure 3.10 Picture 1-10

Group	Unclear	MI	EL	MSU
Number	**35**	**3**	**5**	**2**

Figure 3.11 Picture 1-11

Group	Unclear	MI	EL	MSU
Number	**29**	**9**	**5**	**2**

Figure 3.12 Picture 1-12 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

3.1b Alternative 2 Result

Group	Unclear	MI	EL	MSU
Number	**38**	**4**	**1**	**2**

Figure 3.13 Picture 2-01 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**34**	**7**	**3**	**1**

Figure 3.14 Picture 2-02 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**33**	**6**	**5**	**1**

Figure 3.15 Picture 2-03 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)
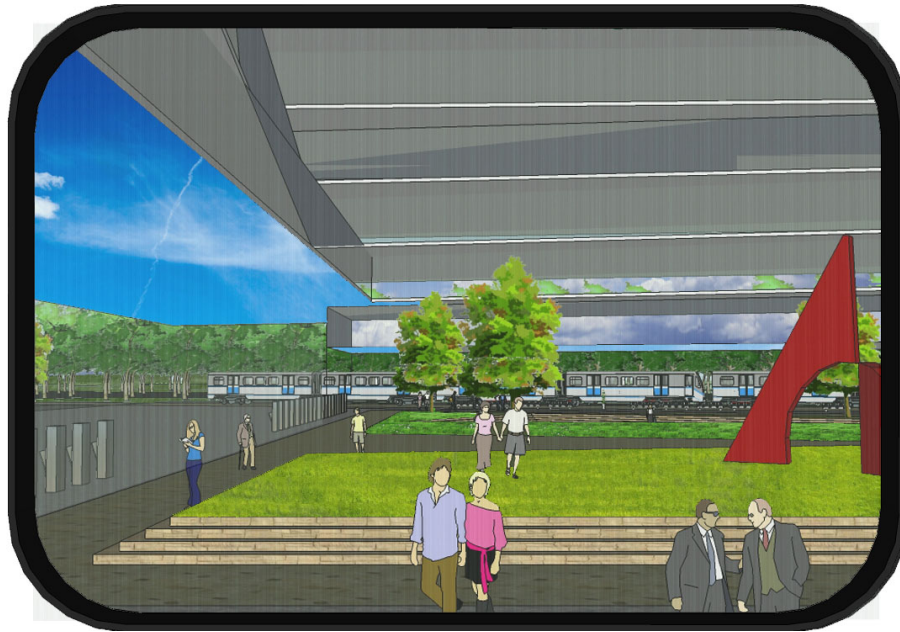
Group	Unclear	MI	EL	MSU
Number	**27**	**1**	**10**	**7**

Figure 3.16 Picture 2-04
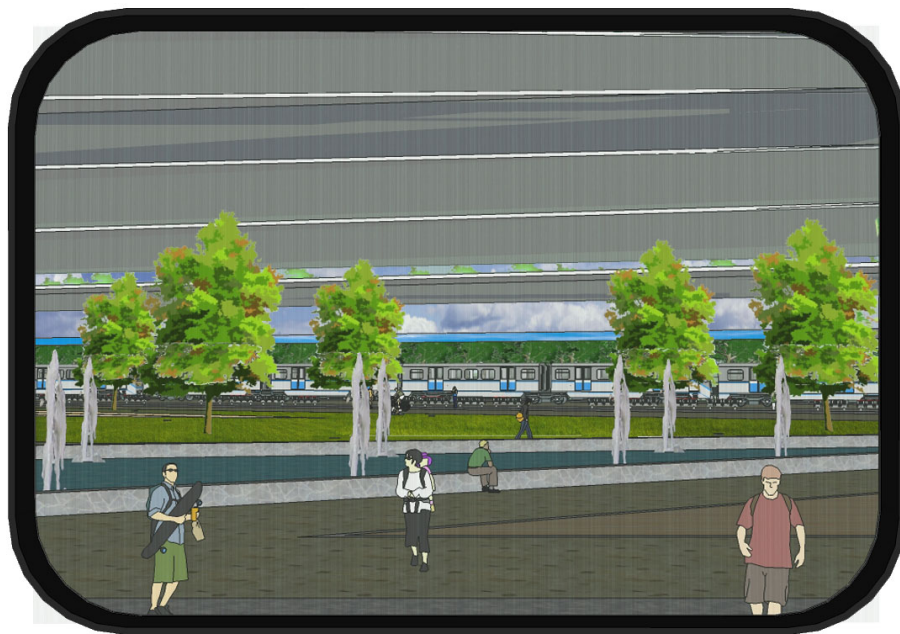
Group	Unclear	MI	EL	MSU
Number	**30**	**3**	**6**	**6**

Figure 3.17 Picture 2-05
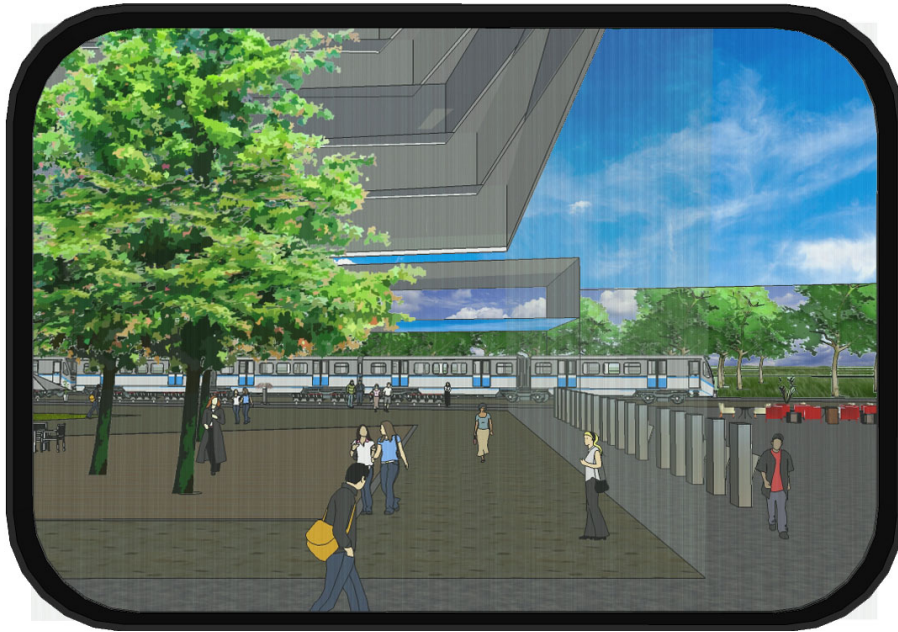
Group	Unclear	MI	EL	MSU
Number	**28**	**1**	**9**	**7**

Figure 3.18 Picture 2-06 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**34**	**6**	**2**	**3**

Figure 3.19 Picture 2-07 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**35**	**5**	**2**	**3**

Figure 3.20 Picture 2-08 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**33**	**6**	**2**	**4**

Figure 3.21 Picture 2-09 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)
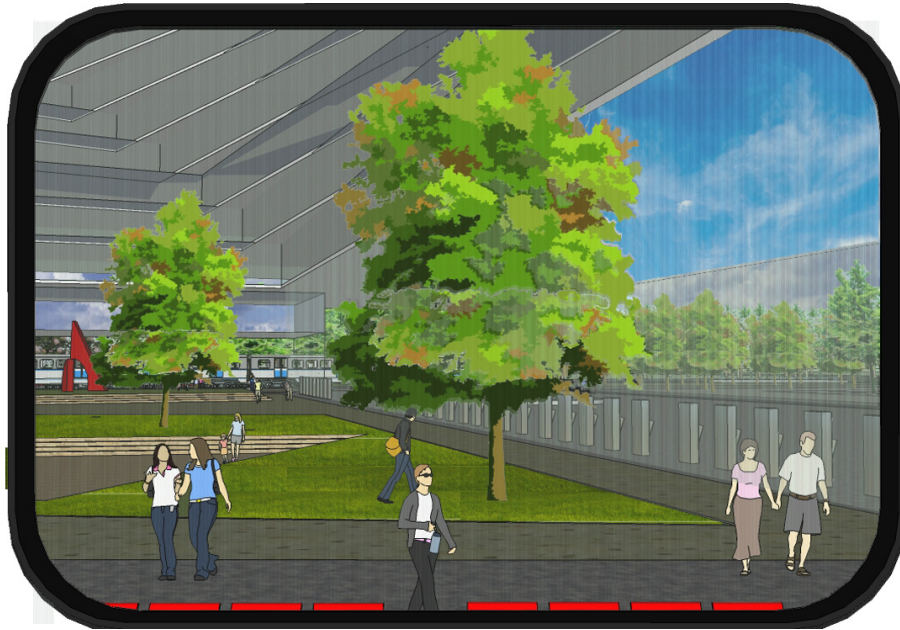
Group	Unclear	MI	EL	MSU
Number	**23**	**4**	**7**	**11**

Figure 3.22 Picture 2-10 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**26**	**3**	**6**	**10**

Figure 3.23 Picture 2-11 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**29**	**6**	**4**	**6**

Figure 3.24 Picture 2-12 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

3.1c Alternative 3 Result

Group	Unclear	MI	EL	MSU
Number	**23**	**10**	**8**	**4**

Figure 3.25 Picture 3-01 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**28**	**10**	**2**	**5**
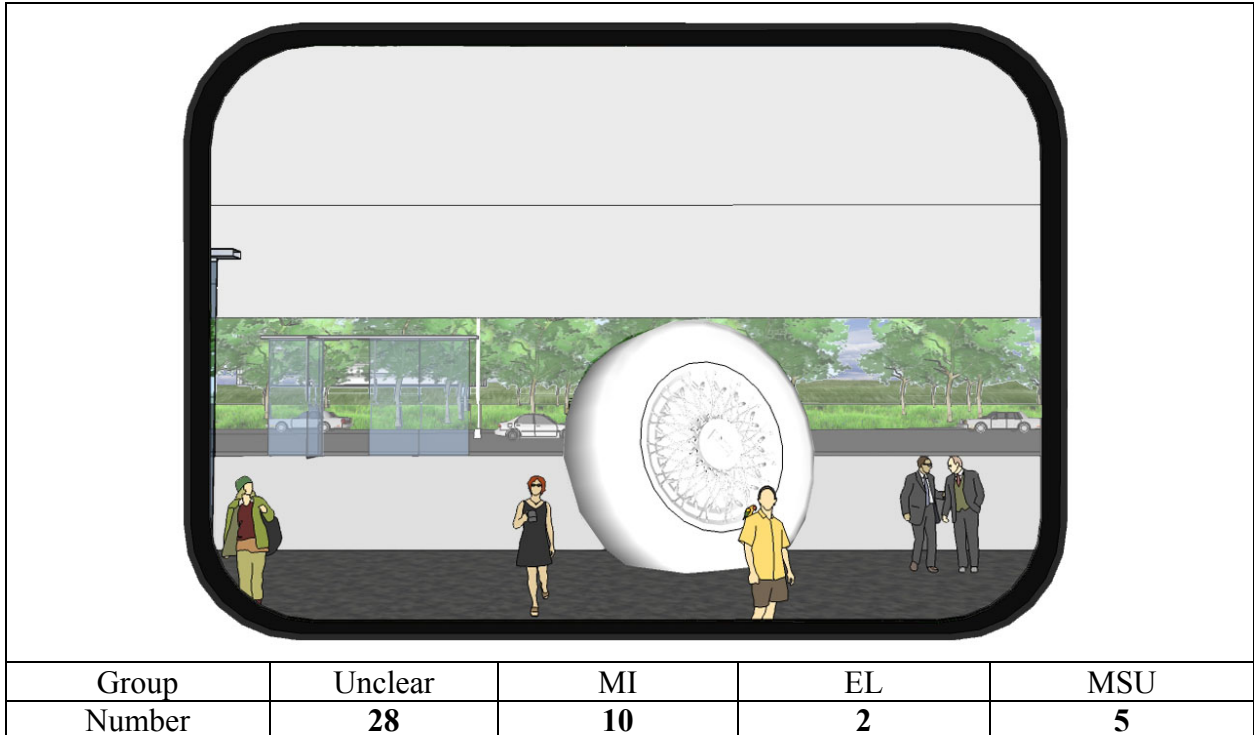
Figure 3.26 Picture 3-02 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**30**	**7**	**3**	**5**
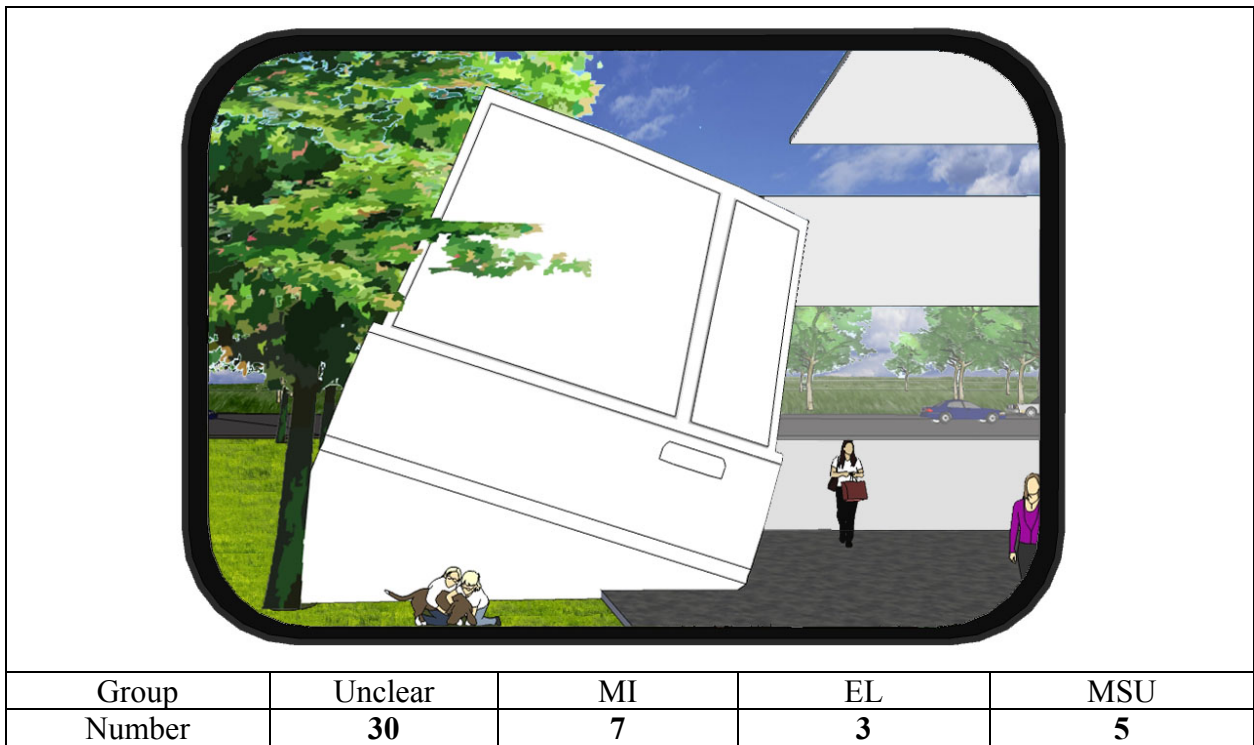
Figure 3.27 Picture 3-03 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**30**	**7**	**4**	**4**

Figure 3.28 Picture 3-04 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission

Group	Unclear	MI	EL	MSU
Number	**32**	**5**	**5**	**3**

Figure 3.29 Picture 3-05 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**27**	**7**	**9**	**2**

Figure 3.30 Picture 3-06 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)
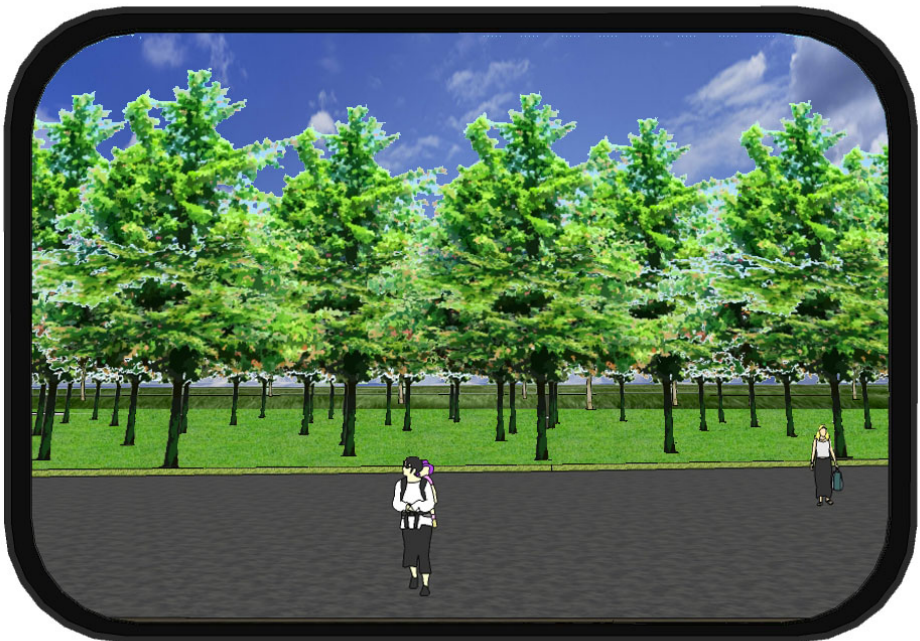
Group	Unclear	MI	EL	MSU
Number	**24**	**14**	**4**	**3**

Figure 3.31 Picture 3-07 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**28**	**14**	**2**	**1**

Figure 3.32 Picture 3-08 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**30**	**11**	**3**	**1**

Figure 3.33 Picture 3-09 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)
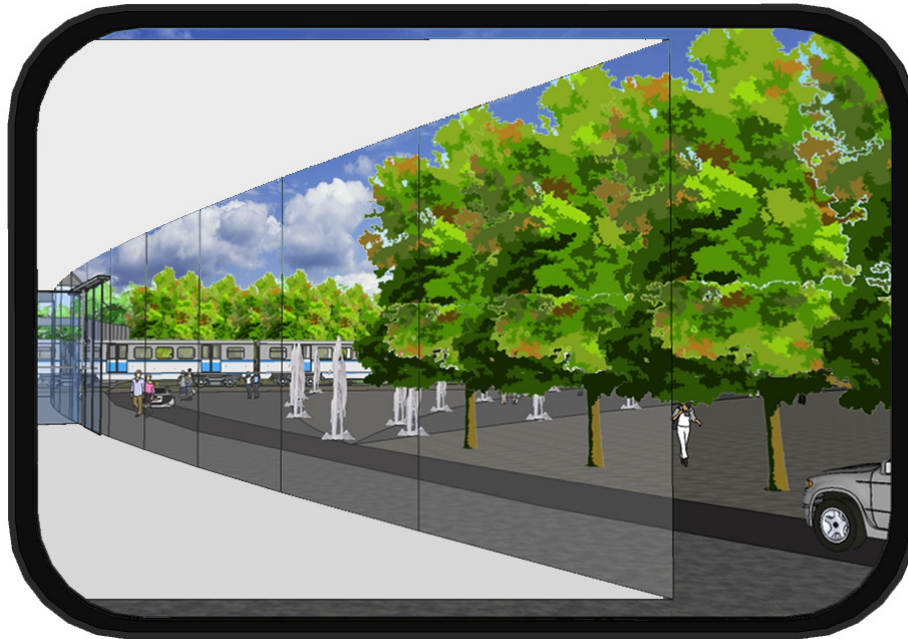
Group	Unclear	MI	EL	MSU
Number	**31**	**8**	**4**	**2**

Figure 3.34 Picture 3-10 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**36**	**5**	**3**	**1**

Figure 3.35 Picture 3-11 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)
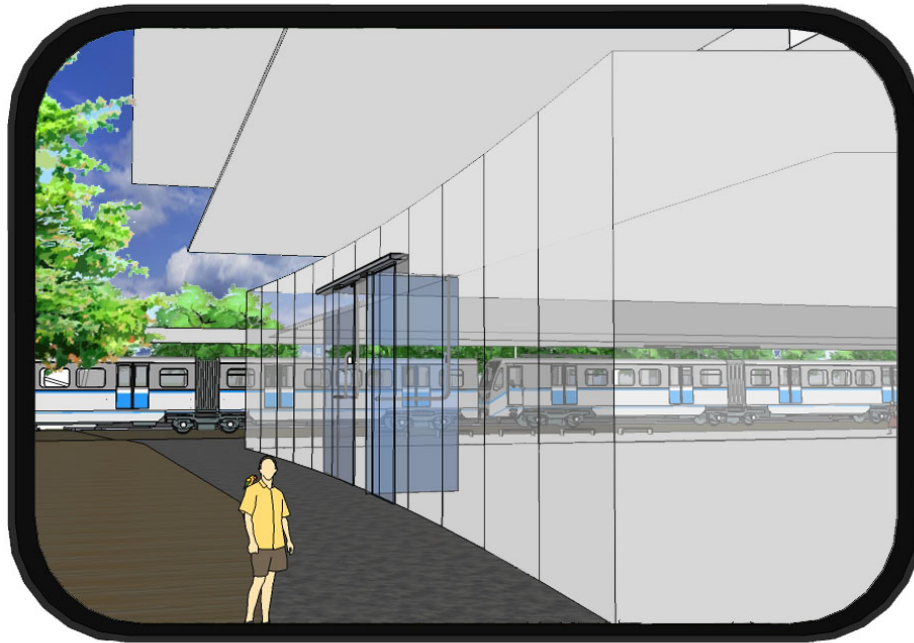
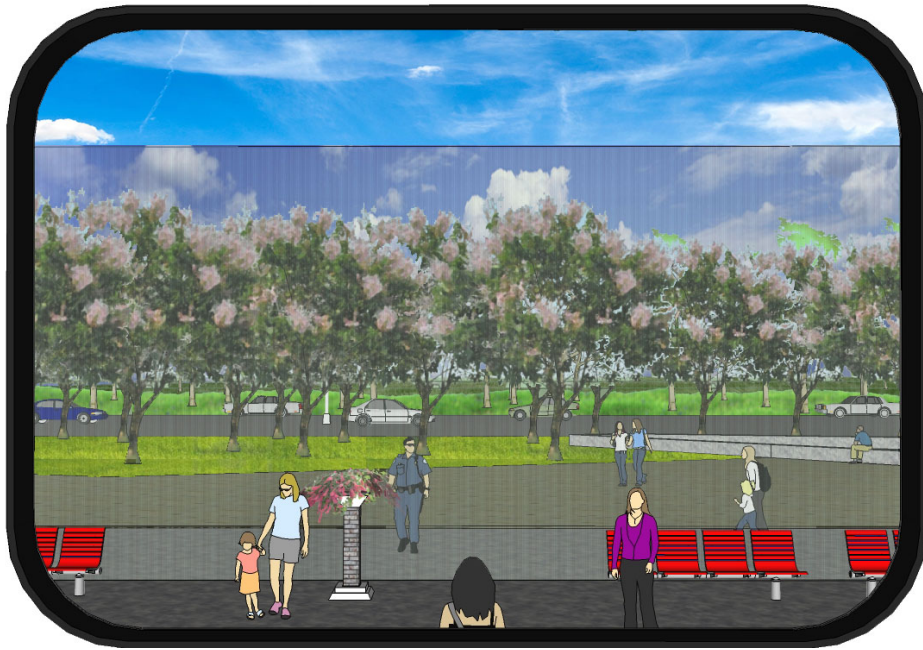| Group	Unclear	MI	EL	MSU
Number	**34**	**5**	**3**	**3**

Figure 3.36 Picture 3-12 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

3.1d Alternative 4 Result

Group	Unclear	MI	EL	MSU
Number	**4**	**6**	**10**	**25**

Figure 3.37 Picture 4-01 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**6**	**4**	**21**	**14**

Figure 3.38 Picture 4-02 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**4**	**3**	**8**	**30**

Figure 3.39 Picture 4-03 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**3**	**2**	**32**	**8**

Figure 3.40 Picture 4-04 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)
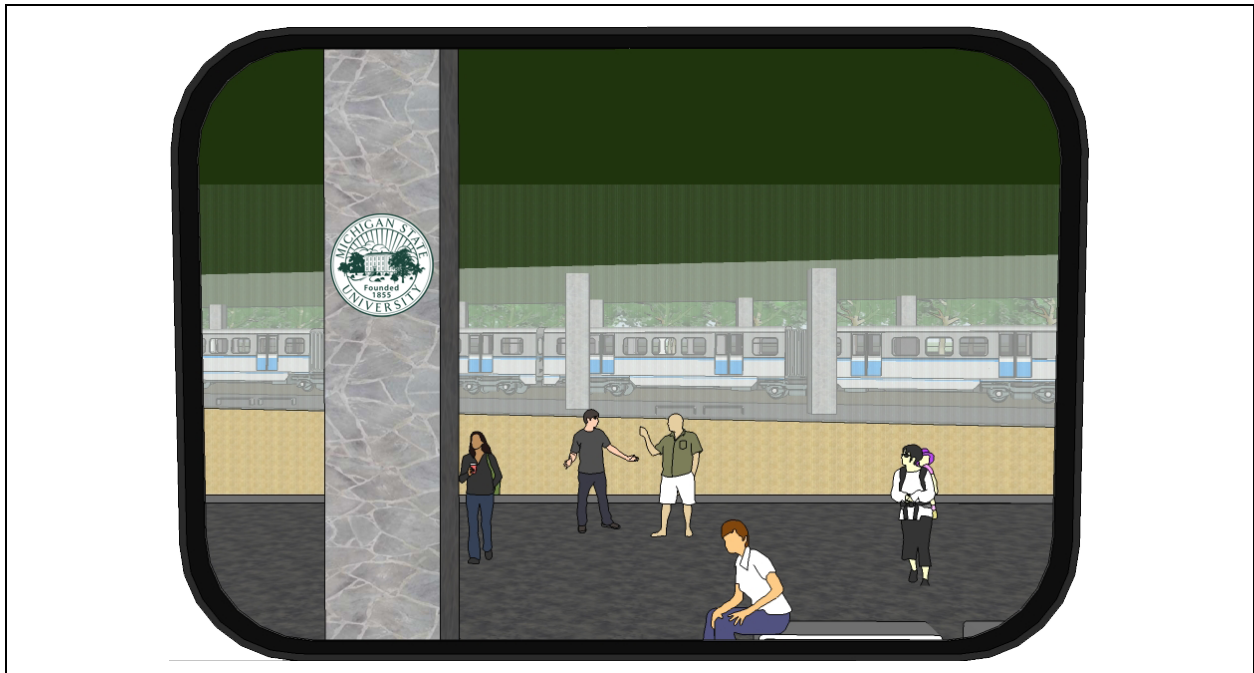
Group	Unclear	MI	EL	MSU
Number	**3**	**3**	**8**	**31**

Figure 3.41 Picture 4-05 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**20**	**8**	**9**	**8**
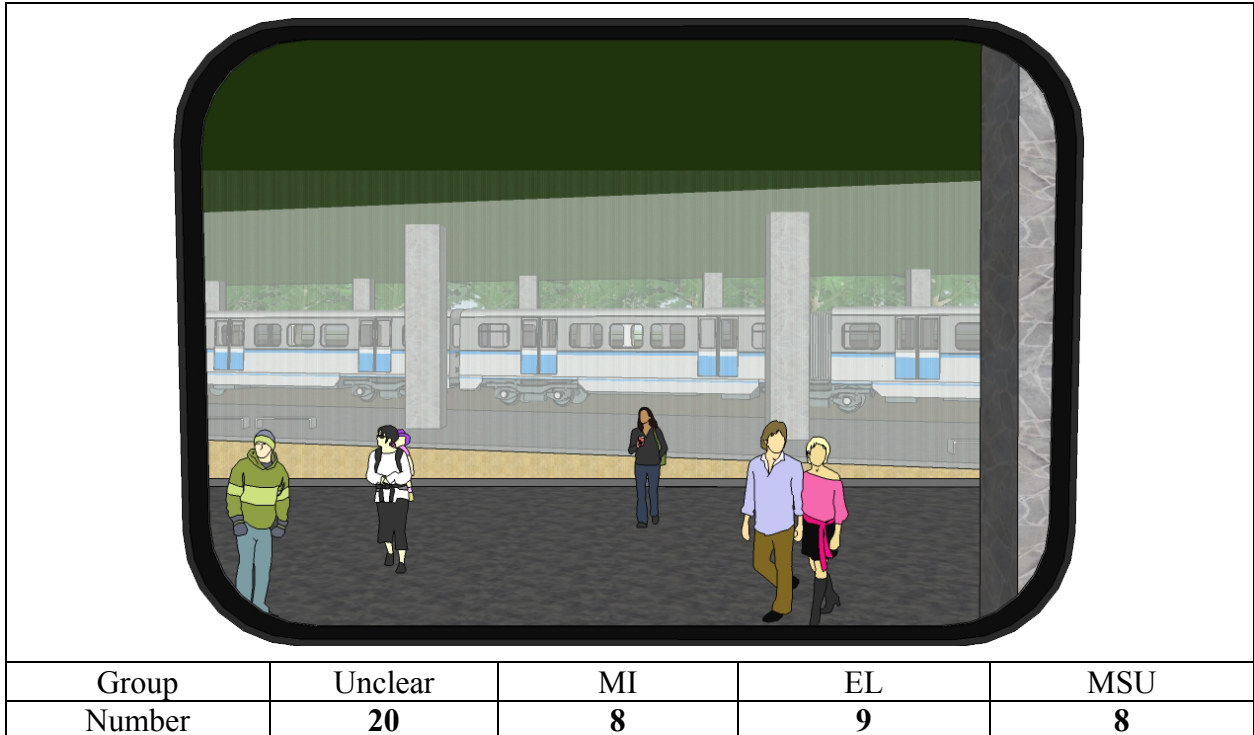
Figure 3.42 Picture 4-06 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**5**	**6**	**14**	**20**
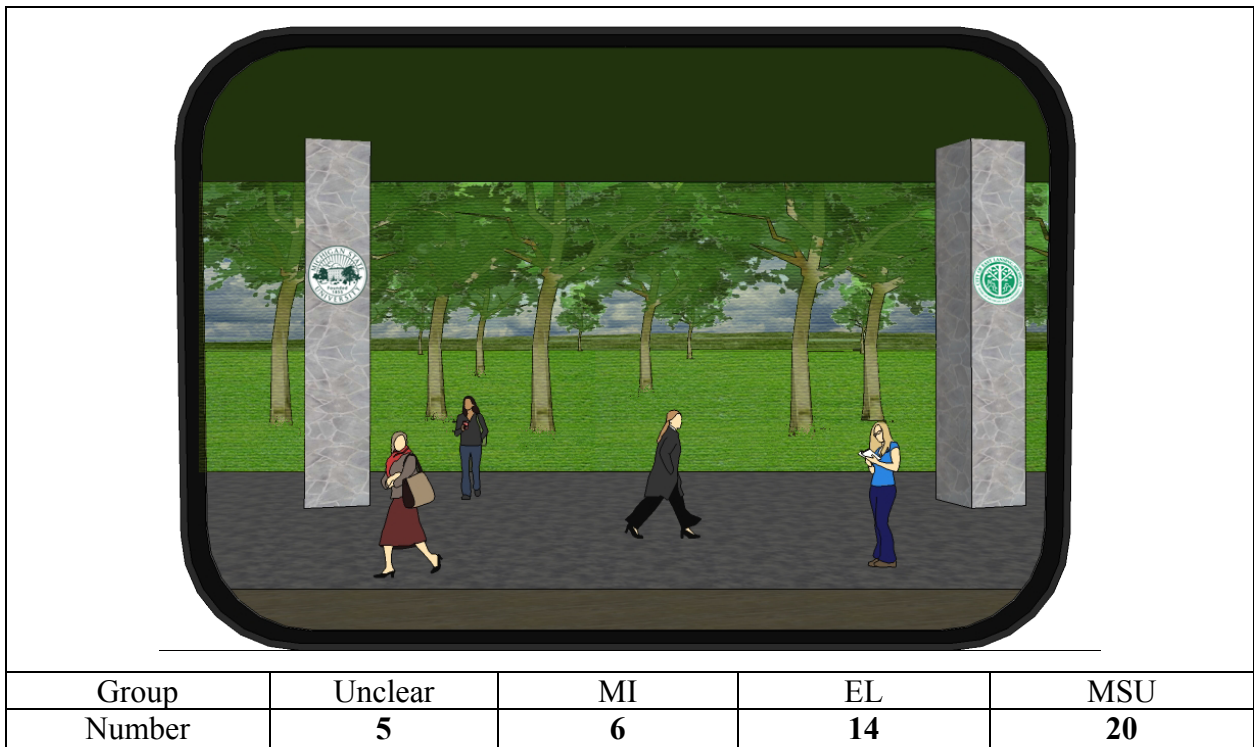
Figure 3.43 Picture 4-07 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**5**	**3**	**28**	**9**
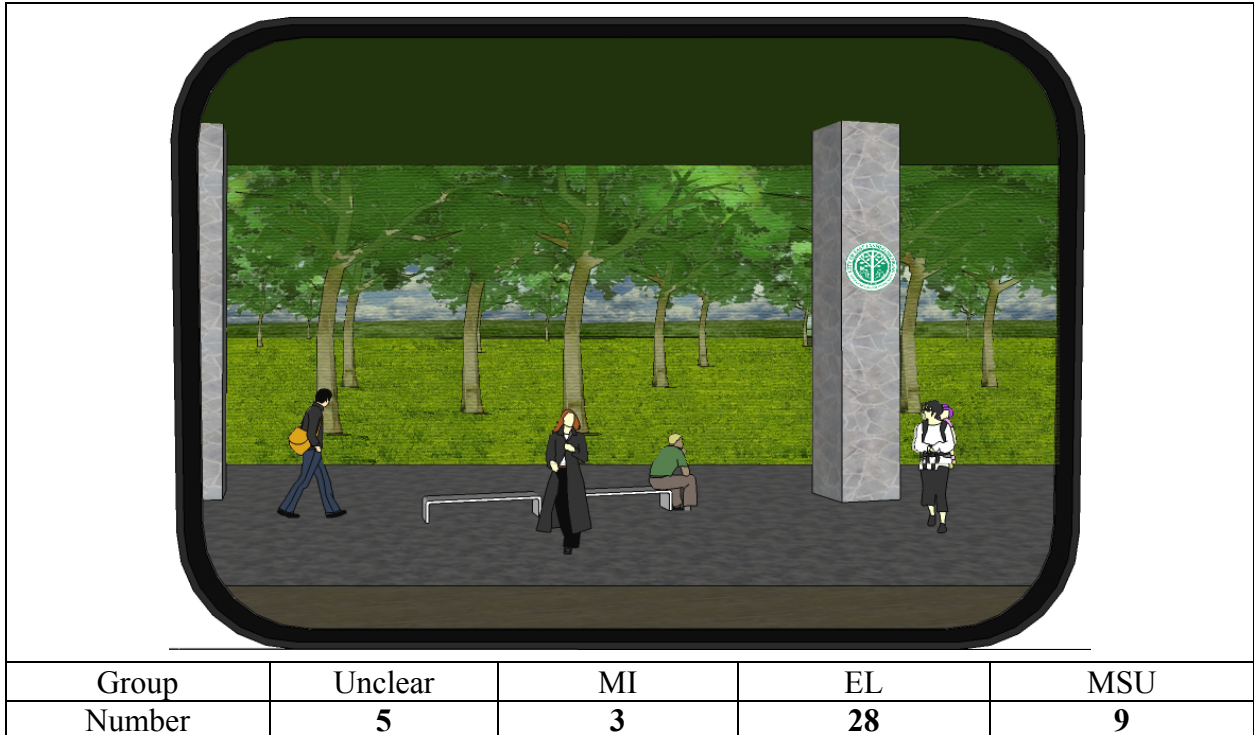
Figure 3.44 Picture 4-08 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**3**	**4**	**9**	**29**
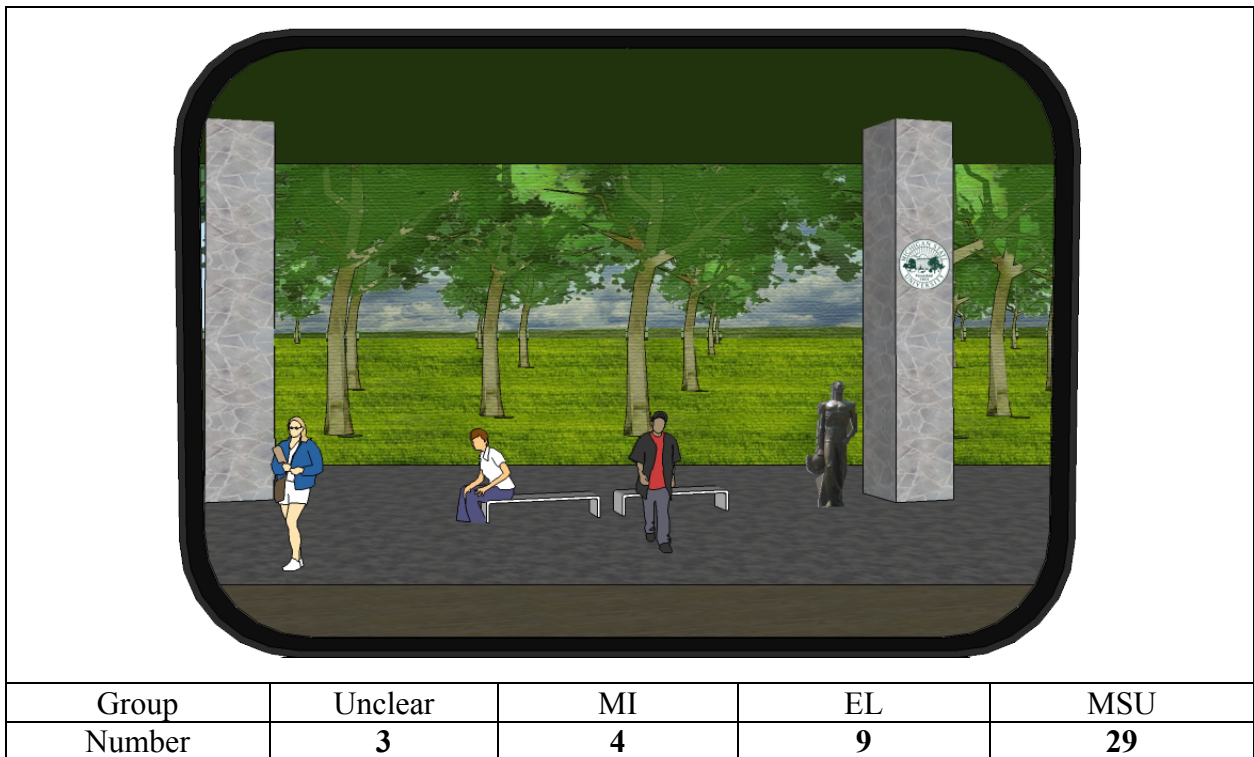
Figure 3.45 Picture 4-09 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**3**	**2**	**3**	**37**
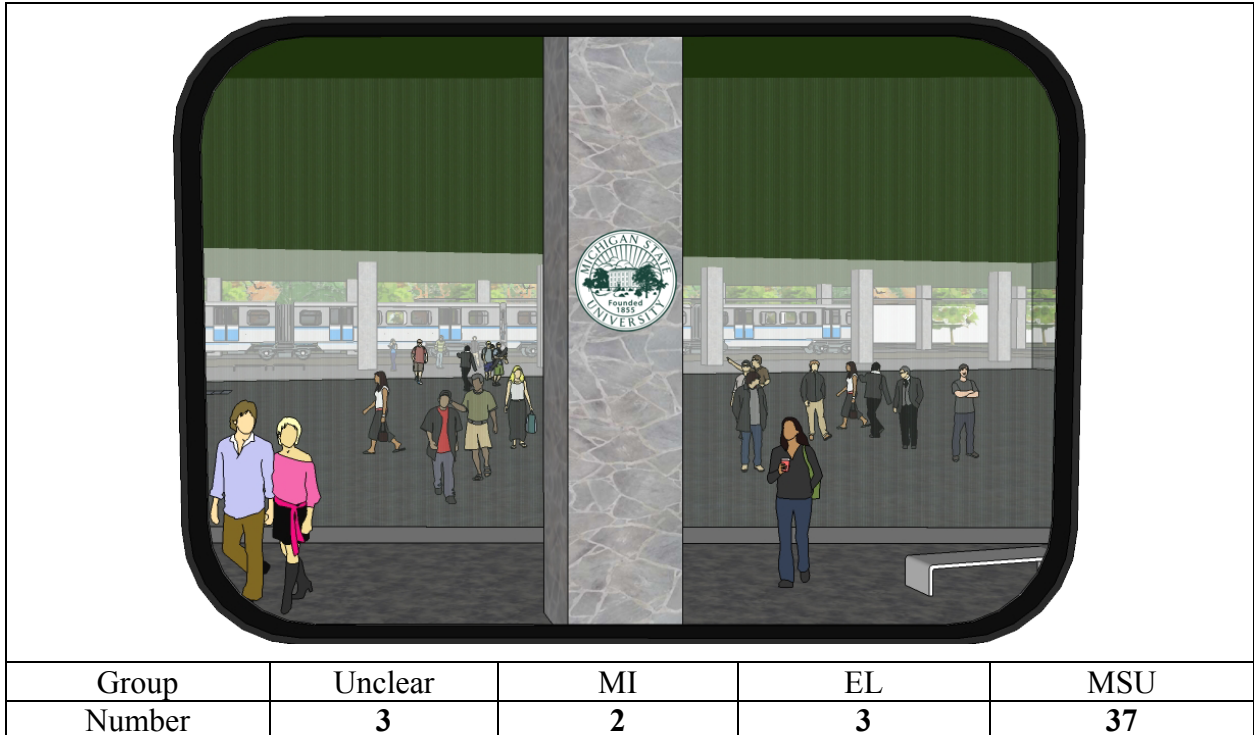
Figure 3.46 Picture 4-10 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**3**	**1**	**28**	**13**
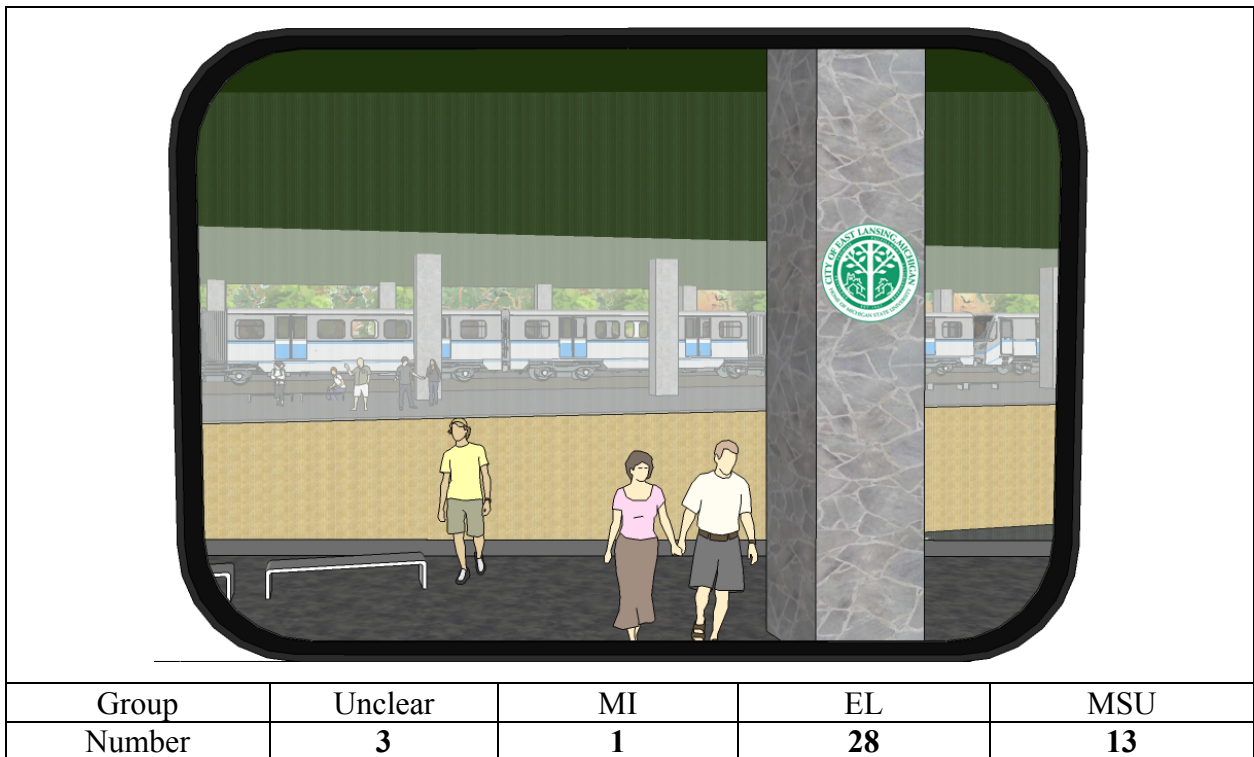
Figure 3.47 Picture 4-11 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

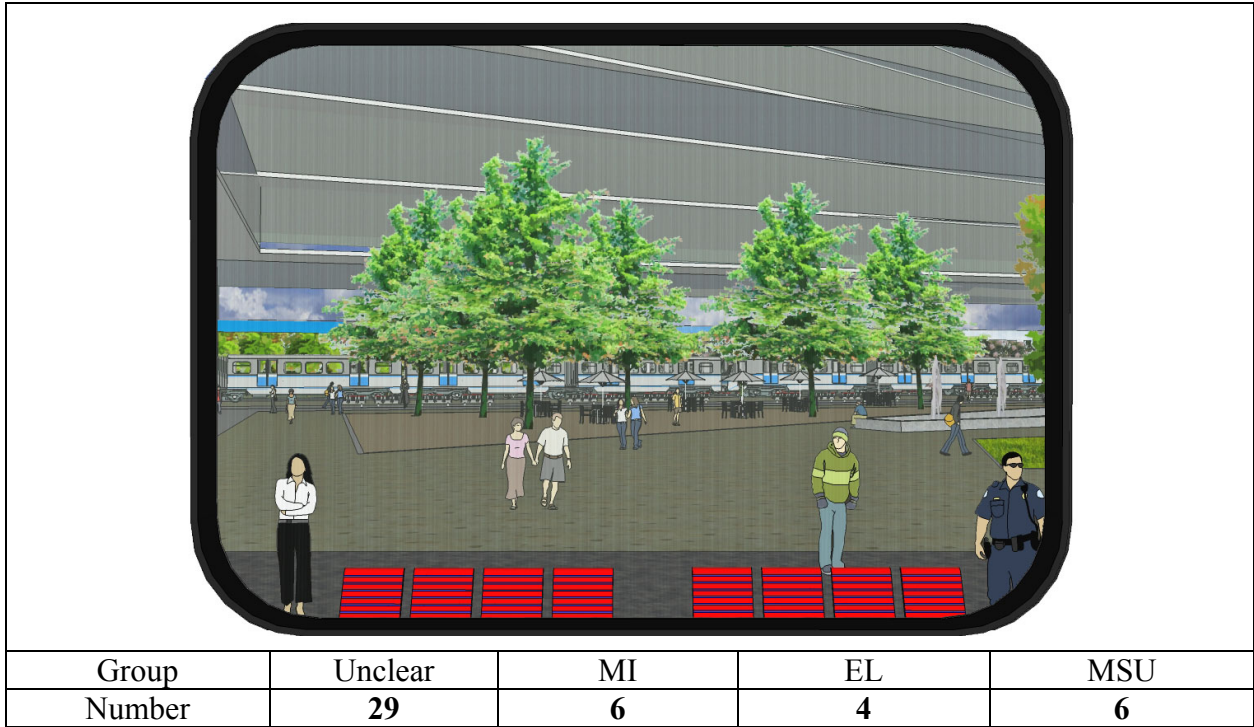| Group	Unclear	MI	EL	MSU
Number	**15**	**3**	**10**	**12**
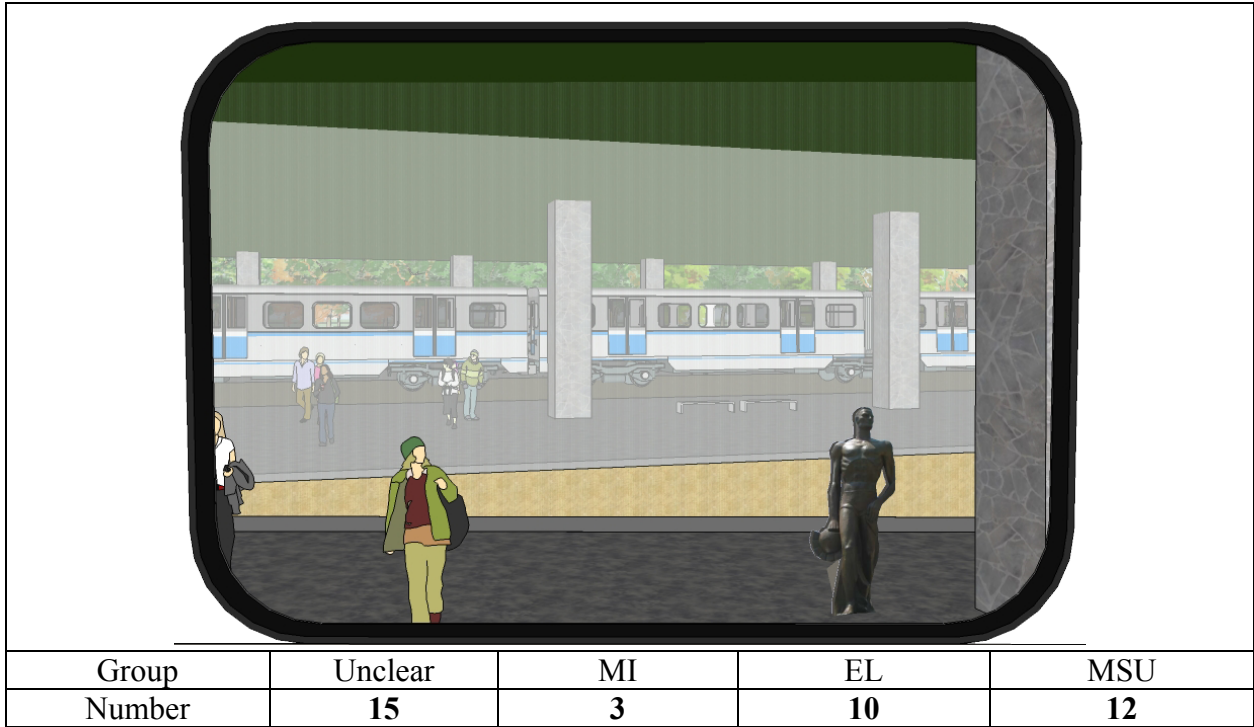
Figure 3.48 Picture 4-12 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

3.1e Alternative 5 Result

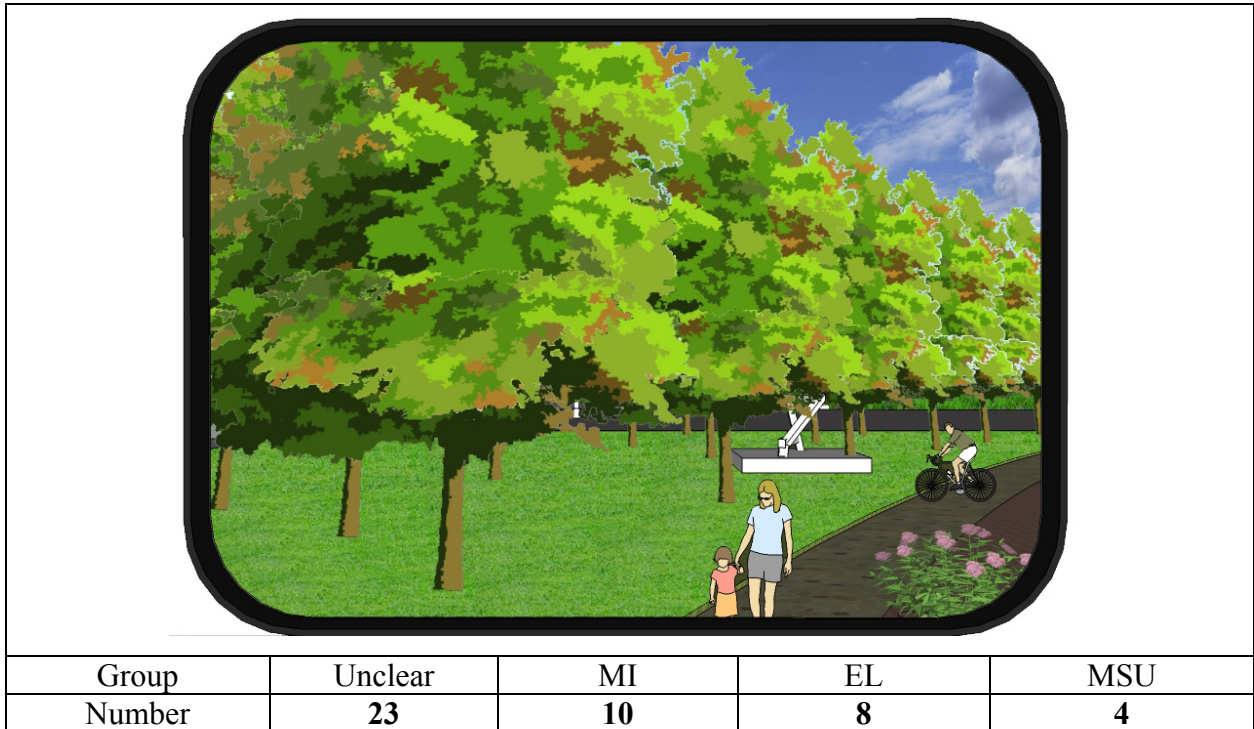| Group	Unclear	MI	EL	MSU
Number	**9**	**3**	**2**	**31**
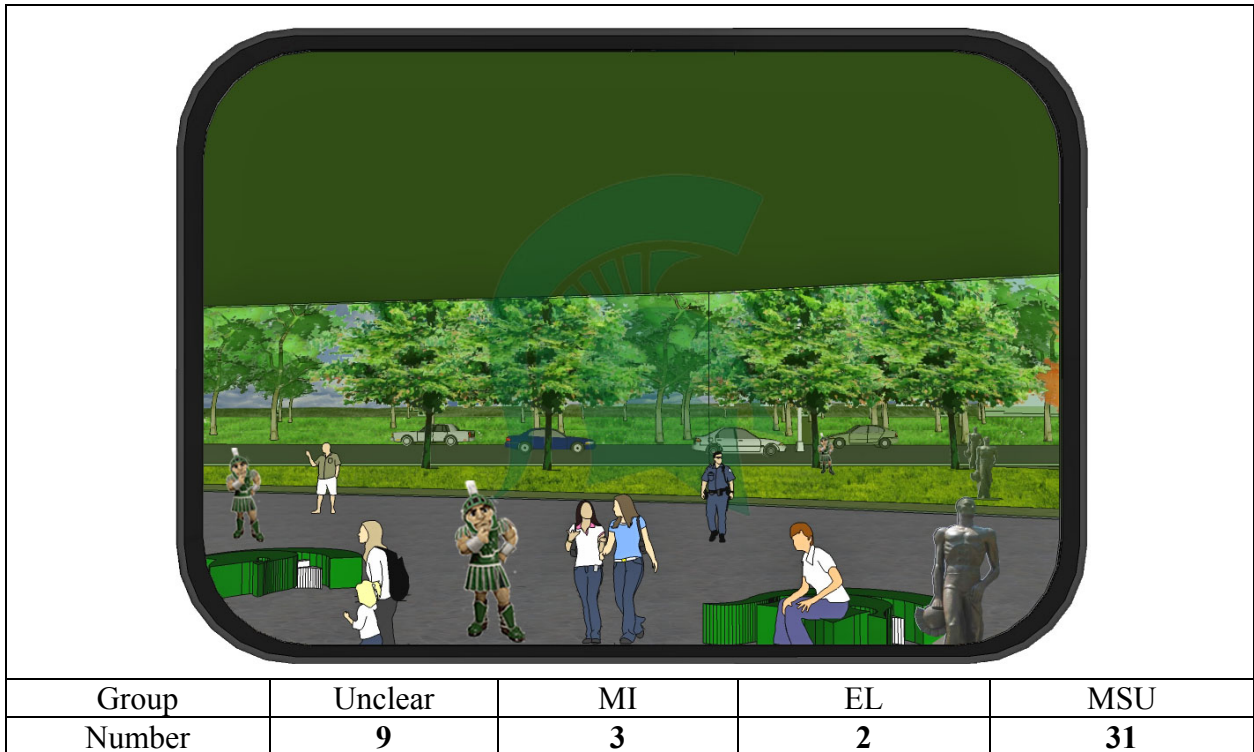
Figure 3.49 Picture 5-01 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**8**	**3**	**1**	**33**

Figure 3.50 Picture 5-02 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**8**	**1**	**3**	**33**

Figure 3.51 Picture 5-03 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)
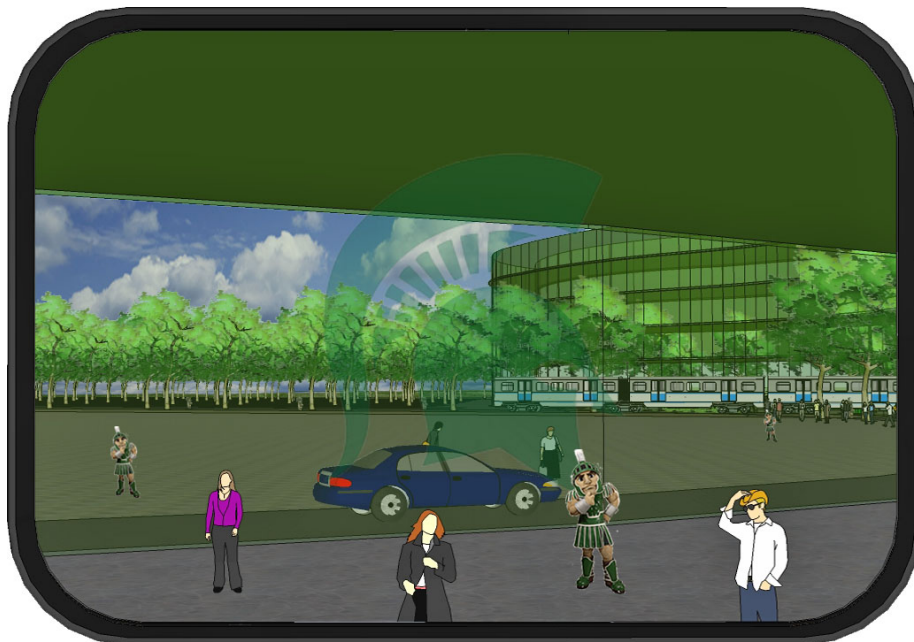
Group	Unclear	MI	EL	MSU
Number	**4**	**1**	**0**	**40**

Figure 3.52 Picture 5-04 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)
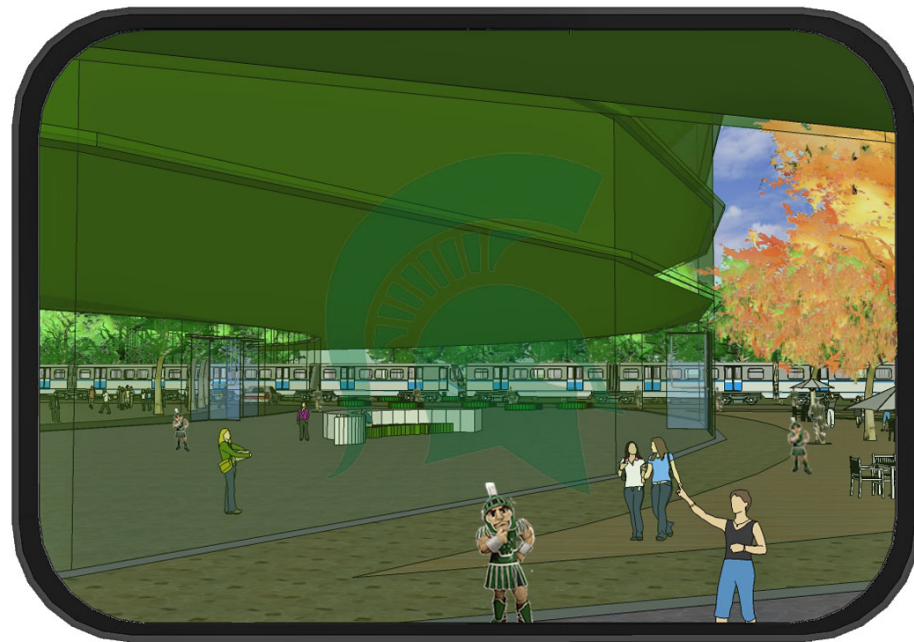
Group	Unclear	MI	EL	MSU
Number	**6**	**1**	**0**	**38**

Figure 3.53 Picture 5-05 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**6**	**1**	**4**	**34**

Figure 3.54 Picture 5-06 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)
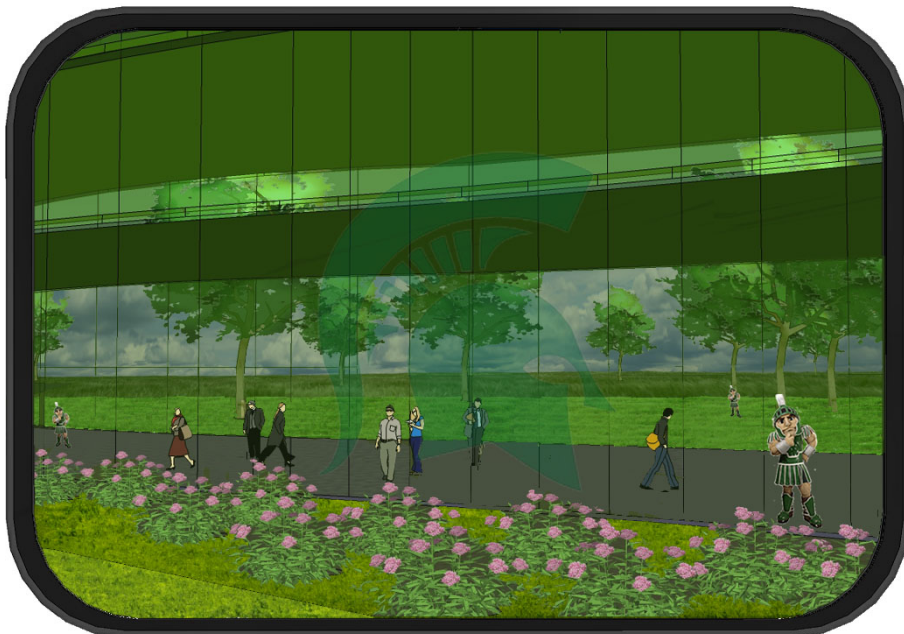
Group	Unclear	MI	EL	MSU
Number	**6**	**1**	**2**	**36**

Figure 3.55 Picture 5-07 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**6**	**2**	**0**	**37**

Figure 3.56 Picture 5-08 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**6**	**2**	**1**	**36**

Figure 3.57 Picture 5-09 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**7**	**1**	**4**	**33**

Figure 3.58 Picture 5-10 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**4**	**2**	**1**	**38**

Figure 3.59 Picture 5-11 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

Group	Unclear	MI	EL	MSU
Number	**7**	**1**	**1**	**36**

Figure 3.60 Picture 5-12 (Copyright © 2013 Wan-Chu Lin, all rights reserved, used by permission)

3.2 Friedman's Test Result

Table 3.1 The statistic of the survey result -1.

View	Treatment1		Treatment2	
	Score	Rank	Score	Rank
1	58	4	57	5
2	60	5	61	4
3	61	5	64	4
4	79	4	87	3
5	85	3	78	4
6	70	5	85	3
7	58	5	64	4
8	64	4	63	5
9	63	5	67	3
10	87	4	96	3
11	64	4	90	3
12	70	4	77	3
Rank Total		52		44
Squares		2704		1936
Sum of squares		7610		
k=5				
b=12				

Table 3.2 The statistic of the survey result -2.

View	Treatment3		Treatment4		Treatment5	
	Score	Rank	Score	Rank	Score	Rank
1	83	3	146	1	145	2
2	74	3	133	2	149	1
3	73	3	154	1	151	2
4	72	5	135	2	166	1
5	69	5	157	2	160	1
6	76	4	95	2	156	1
7	76	3	139	2	158	1
8	66	3	131	2	158	1
9	65	4	154	2	157	1
10	67	5	164	1	153	2
11	59	5	141	2	163	1
12	65	5	99	2	156	1
Rank Total		48		21		15
Squares		2304		441		225
Sum of squares		7610				
k=5						
b=12						

In table 3.1 and table 3.2, the original score and the rank of each treatment is presented.

In table 3.3, it shows the test statistic after applying Friedman's test. The number of this test statistic is 37.667 which is greater than chi-square 4df, which is 14.86. Since 37.667 is greater than 14.86 reject the null hypothesis and accept the alternate hypothesis that at least one treatment is different than the other treatments, $p<0.005$.

There are no ties in this test statistic. Therefore, the equation of ties is not applied in this investigation.

In table 3.2, the multiple-comparison procedure revealed 3.448. The absolute value between the sum of the ranks must be larger than this number in order to be significantly

different (p≤0.05). In this investigation, all of the outcomes are greater than 3.448 including each

treatment is significantly different with other treatments.

Table 3.3 The statistic of the Friedman's Test.

test statistic first half		253.6666667	
test statistic second half		216	
test statistic		37.66666667	
chi-square 4df		14.86	p=0.005
since 37.667 is greater than 14.86 reject the null hypothesis			
accept the alternate hypothesis that at least one treamtent			
is different than the other treatements, p<0.005			
t1-t2	8		yes
t1-t3	4		yes
t1-t4	31		yes
t1-t5	37		yes
t2-t3	4		yes
t2-t4	23		yes
t2-t5	29		yes
t3-t4	27		yes
t3-t5	33		yes
t4-t5	6		yes
alpha	0.05		
alpha/k	0.0025	0.4975	
z	2.81		
test	3.448370193		

CHAPTER 4

4.1 Discussion

This thesis explores the relationship between arrival cognition at public transportation stations and design. I visited some train stations before I did this study.

In King's Cross Station in London, this station combines with historical building and new modern elements. Designers want to make people to understand that even London is an old city, but globally recognized for its influence on fashion and modern events happen there everyday. This station illustrates to people that although London is an old city, it tries to change to fit the contemporary image of London. However, passengers do not easy to understand the meaning that planners and designers want to transfer to people, and then they do not know where they are when they arrive this station. As a result, the England government spent a big amount budget to promote this station, but the cognition of this station is still unclear.

In Tokyo Station, it does not represent the present Tokyo, because there are no elements that reflect the contemporary styles of Tokyo modern culture. It also does not represent the historical Tokyo either, because the style of the building is Renaissance, which is an architectural movement from western cultures. The relationship between Tokyo Station and the surrounding high-rise buildings is not harmonious. When people arrive at Tokyo station, they do not easily notice they have arrived in Tokyo.

In Longshan Temple Station, architects and landscape architects applied the temple's features when they designed the station. Architectural elements and arrangement of buildings as well as a garden have features reminiscent of Longshan temple, which was constructed using a traditional Chinese building style. They also carved the history of Longshan Temple on the

ground inform people about the history of Longshan Temple. The interior of this station weas also designed and decorated with the features of the Longshan temple to announce passenegers here is Longshan Temple Station. Many elements throughout the station and its grounds make an effort to connect the Longshan Temple to the station.

In Union Station in Washington D.C., it was designed in monumental style which reflects the features of other memorial buildings and museums in Washington DC., therefore, it is really easy to make passengers to understand where they are; however, the identity of the city is not well represented in the interior of the building. The interior of this building is really dark without any vitality. It is not the image of a capitol. The arrangement of the interior is not comfortable which make passengers anxious. The way finding system of this building and the connection with other transportation of this station are also not friendly. There is a future plan for Union Station, this new station building is designed in modern style. The features of the new Union Station is common which can be placed everywhere. When people arrive the new Union Station they have no idea with where they are.

In Gare du Nord station, the exterior of this station architecture reflects to the history and features of Paris. When people see the outside of this building, they are easy to understand where they are. However, the arrival cognition of this station is not clear. When passengers arrive this station they confuse in where they are.

In Oriente Station, the arrival cognition of this station is obvious. When the trains arrive at this station passengers can see the twenty-five meters high cover made by glass and metal of the platform when they stay inside of the tracks. The structure of this station shares some familiar features of the new Union Station, but the identity of Oriente Station is clear that makes passengers understand where they are.

In Shanghai South Station, this was the first circular station building in the world. In design, this building is fantastic, unique, and majesty. However, passengers always get lost inside the station building. The passenger oriented was ignored by planners and designers.

All of these stations have advantages and disadvantages which can be the prototype for the future station design projects. The advantages of these stations should be maintained, and the disadvantages of them should be prohibited. As the result, the quality of the stations will be promoted.

The East Lansing Train Station is my study site. For the study, I developed five different levels of design treatments examined in a respondent survey. The statistical results suggest that the level of design does make a difference.

For perspective, the survey results suggest that treatment one is at the lowest position with the poorest cognition score. Treatment two is at the second lowest position with the second poorest score. Treatment three is at the middle position with the third best score. Treatment four is at the second best position with the second highest score. Treatment five is at the best position with the highest cognition score.

The actual results suggest that treatments one, four and five are in the rank positions I expected. However, treatments two and three exchanged their positions. I will explore the reasons for the difference in the following paragraphs. Although, the results are different from my expectations, the study still supports the notion that a station's image influences passengers' cognition of place.

In design treatment one, I did not apply any local features when I created this design. It is a small and simple train station which only provides limited services that satisfies the basic train station requirements. This kind of train station can be applied everywhere, because it does not

have any particular character. When respondents observed these pictures most of them could not associate a place with the design. Their suggestions suggest that this design treatment earned the lowest scores. The result are consistent with my initial ideas. There were a few respondents who did choose a place for the treatment. I did not expect them to actually choose a place. The score for this treatment is 819 which is much higher than my expected score of 540 ($(45×1) ×12$). In my opinion, this occurred because I planted lots of trees at some vacant location in this site. The state of Michigan is not a high developed urban environment still containing many natural landscapes. East Lansing is a tree city with a seal of a big tree. I believe some respondents had the knowledge that Michigan and East Lansing have a tree related identity. Some survey participants respondents educated me to understand that natural resources can be important characteristics to a place. There are planners and designers who are not be aware of the importance natural environment characteristics. Unfortunately, I was one of them. Fortunately, I obtained this knowledge by conducting this study. It is never too late to understand some knowledge I did not know before. This is a good example. This investigation suggests that planners and designers should value the natural features when they are doing designs which apply local characteristics to make places with identity.

In design treatment two, I applied a few local characteristics when I did this design that made this design treatment different with the design treatment one. The score from he respondents resulted in a total of 889 which is quite close to my expectations of 900 ($[(15×1)+(30×2)] ×12$). I only added some art features and water elements, which are related to state of Michigan and East Lansing. There were some respondents who noticed them, even though these elements were not always presented clearly. I believe that sometimes a modest effort creates a big difference in the identity of place. This means that a station design adding a

few local elements can increase the numbers of passengers who know where they. This is a result that supports my ideas about place cognition.

In design treatment three, the position of the result placed it in a different order than my expectations. The resulting score was 845 which is much lower than my expectations. I thought the score would be close to 1260 ($[(5 \times 1)+(20\times2)+(20\times3)] \times12$). I believe the difference occurred because I applied several characteristics related to Lansing that apparently were too subtle. For example, I made all facilities and furniture in white and planted lots of trees to reflect the Michigan State University's slogan "go green, go white," plus East Lansing is a tree city and covered by snow in winter, and lots of automobile elements to reflect Lansing as a car industry city. However, these elements were too subtle leading the respondents to not easily understand the relationship between these characteristics with Michigan State University and East Lansing. This result suggested to that the rare perception differences between the planners/designers and citizens. One can observe many high quality works around the world that were created by well-known professions. But the perceptions between their works and people may be quite different. I believe this situation occurred because of the design education differences between professionals and people. Often professionals desire to make their works unique and particular. They may apply some local characteristics and then use other ways to annotate their design ideas. Although, their ideas are interesting, people may not easily to perceive and understand some design features. People may only enjoy some visual aspects of these works, but they do not know the meanings professionals want to transfer. Moreover, they do not know the relationship between the works and local area. Planners and designs should consider this problem when they do their design projects. Design is a part of people's life, especially which is related to public

transportation stations. Based upon my examination of treatment three, the characteristics of a place should be annotated clearly instead of subtly to assist passengers.

In design treatment four, I applied Michigan State University and the City of East Lansing seals when I created this design. A sign is always the most powerful soundless tool to tell people where they are. This design treatment earned a score of 1648 which was near my expectations of 1740 ([(35×3)+(10×4)]×12). This result made this design treatment second of the five design treatments. I believe the most important reason was that this design treatment earned a high score, because of signage. There are many different signs as daily life. Sign designers try to create signs are easily to be understood. The entrance signs of Michigan State University are simple, and located an entrance to this school, assisting visitors to know they have arrived at Michigan State University. I applied the Michigan State University and the City of East Lansing seals on each column at this train station which are visible to passengers in the train. This is an important issue, because there are lots of train stations only established one big sign in the middle of the whole platform. Passengers can only see this sign at specific locations. If they are not at the key location they cannot see this sign, and may not know where they are.

In design treatment five, I applied lots of Michigan State University's characteristics when I created this design treatment. These elements made this design treatment obtain the highest score which is 1872. The score is closed to my expected score which is 1980 ([(15×3)+(30×4)]×12) and at the first position in these five design treatments.

Every survey has limitations. This survey is not exempt either. The respondents of this survey are all Michigan Sate University students, therefore, they are familiar with their school. If the respondents could include international passengers, out of Michigan State passengers, Michigan State residents, and the Michigan State University students, the result of this survey

might be more informative. However, this study does contribute knowledge concerning transportation place identity.

The survey results shows that the more local characteristics that are applied into a public transportation station design project, more people know where they are when they arrive. Identity is an important issue in train stations that make passengers know where they are and to announce them to disembark the train when they get their destinations. Moreover, passengers can imagine the features of the cities or counties they may have never been visited before by the place identity characteristics the train station presents.

This thesis is focused upon train station identity. However, it is the beginning of place identity. This thesis may help more people to understand the importance of identity in different categories. The idea can be applied to different public transportation settings, such as airports. International airports play an important role for a country. Therefore, lots of governments may budget place identity in their international airports yet. It is nearly impossible for passengers to depart the aircraft at the wrong airport. Therefore, the features at an airport could give passengers the best first image and pleasant memorize. Visitors can have a good image of the countries and want to come back again in the future.

In addition, each place should have its own identity that makes visits memorable. Both natural beauty and manmade works can make places with specific identity. Some people like to picnic at the forest to enjoy the natural beauty; others prefer to enjoy some amazing architecture or art works. They are totally different features to select, but the common point they share is identity. Identity makes a place with particular characters that attracts more visitors. We can see some attractive scenery spots around the world. For example, Venice in Italy, which is a water

city always attracts lots of travelers from different countries, has clear identity. Identity makes a place special that make people to visit it reasonable.

In environment, station can have identity. People can also have identity; Such as Karl Lagerfeld, who is the chief design of Chanel, has clear personal characteristic (Fashion-Forum.org, 2013). The well-known architects prefer to dress in black that gives them with specific identity. Some daily products we use everyday are also created with identity; for example, phones, shoes, bags, etc.

I mention these issues because they are all related to identity in various professions and disciplines. Maybe they are not related to landscape architecture directly; however, they are a part of our daily life. I hope using these simple examples to inform people concerning the value and importance of place identity. I am professional in landscape architecture. Therefore, environment is an important subject that I am concerned about. I hope this thesis has contributed knowledge about being thoughtful concerning environmental identity benefiting our environment.

4.2 Conclusion

As I anticipated, the result shows that each design treatment is significantly different ($p \leq 0.005$). There are five design treatments with different cognition levels. These five design treatments range from few locational identity features to quite blatant identity characteristics. A design treatment gained a higher score respondents knew where they were; conversely, a design treatment gained a lower score when respondents did not know the location of the survey images. This result shows that spatial features can influence people's knowledge of where they are. As a result, making a train station with a strong character identity can help more passengers to know

where they are and assist them to their destinations. A train station with particular identity can

reduce the risk of passengers getting off the train at the wrong station and facilitate passengers

positive impression of place.

BIBLIOGRAPHY

BIBLIOGRAPHY

Abache, L. (2001). Oriente Station, Lisbon. In *Galinsky*. Retrieved 2013

Adobe (2007). *Photoshop CS3*. San José, CA: Adobe.

Amtrak (2008). FY2008 District of Columbia. *Amtrack fact sheet*.

Apelt, R. (2008). *Wayfinding in the built environment (Tech. Rep.)*. Public Works Queensland, Brisbane, QLD, Australia.

Arch Daily (2012). Eli & Edythe Broad Art Museum / Zaha Hadid Architects. In *Arch Daily*. Retrieved 2013

Arrington, G. B., & Cervero, R. (2008). *Effects of TOD on housing, parking, and travel*. Washington, D.C. : Transportation Research Board.

Arthur, P., & Passini, R. (1992). *Wayfinding: People, signs, and architecture*. New York: McGraw-Hill Book Co.

Autodesk (2013). *AutoCAD 2013*. San Rafael, CA: Autodesk.

Bell, P. A., Greene, T. C., Fisher, J. D., & Baum, A. (2001). *Environmental psychology* (5th ed.). Fort Worth: Harcourt College Publishers.

Brooks (2011). *Shanghai Railway Station*. Retrieved 2013

Brunye´, T., Mahoney, C., Gardony, A., & Taylor, H. (2010). North is up(hill): Route planning heuristics in real-world environments. *Memory & Cognition, 38(6),* 700–712.

Bu Lvnuo, K. Suburban trains. *tome II*, 108. Retrieved 2013

Butler, D. L., Acquino, A. L., Hissong, A. A., & Scott, P. A. (1993). *Wayfinding by newcomers in a complex building. Human Factors, 35,* 159-173.

Calori, C. (2007). *Signage and Wayfinding Design*. Hoboken, NJ: John Wiley & Sons, Inc.

Carmona, M. (2003). *Public spaces – Urban places: The dimensions of urban design*. Boston, MA: Architecture Press.

Caro, M. D. (2012, July 25). *UPDATED: Here's What a Revamped D.C. Union Station Would Look Like*. Retrieved 2013

Casteele, D. (1992). *The cars of Oldsmobile*. Osceola, WI: Motorbooks International.

Center for Transit-Oriented Development (2011). In *ctod.org*. Retrieved 2013

Cheng, T. (2010). The Effect on Lungshan-Temple Business Area under Opening of MRT Banqiao- Nangang Line.

China Daily (2006). Circular station is center of attraction. In *China Daily*. Retrieved 2013

Cohen, D., Nisbett, R. E., Bowdle, B. F., & Schwarz, N. (1996). Insult, aggression, and the Southern culture of honor: An "experimental ethnography." *Journal of Personality and Social Psychology, 70*, 945-960.

Collectif. SNCF Heritage. *tome I*, 142. Retrieved 2013

Curtis, C., Renne, J. L., & Bertolini, L. (Eds.). (2009). *Transit-oriented development: Making it happen.* Burlington, VT: Ashgate.

Daniel, W. W. (2000). *Applied Nonparametric Statistics* (2nd ed., pp. 223-231). Boston: Houghton Mifflin Company.

Davies, C., & Uttal, D. H. (2007). Map use and the development of spatial cognition. In J. Plumert, & J. Spencer (Eds.), *The emerging spatial mind* (pp. 219-247). New York: Oxford University Press.

Denver The Mile Hign City (2006). *Transit oriented development strategic plan*. Denver: Author. Retrieved 2013

Designing for Transit-Oriented Development in Greater Lansing (2011, August). In *CATA*. Retrieved 2013

Dittmar, H., & Ohland, G. (2003). *The New Transit Town: Best Practices In Transit-Oriented Development*. Island Press.

Downs, R. M., & Stea, D. (1977). *Maps in minds: Reflections on cognitive mapping.* New York: Harper & Row.

Evans, G. W., & Pezdek, K. (1980). Cognitive mapping: Knowledge of real-world distance and location. *Journal of Experimental Psychology: Human Learning & Memory, 6*, 13-24.

Fashion-Forum (2013). Karl Lagerfeld – Biography. In *Fashion-Forum.org*. Retrieved 2013

Fewings, R. (2001). Wayfinding and airport terminal design. *Journal of Navigation, 54(2),* 177–184.

Foo, P., Warren, W. H., Duchon, A., & Tarr, M. J. (2005). Do humans integrate routes into cognitive maps? Map-versus landmark-based navigation of novel shortcuts. *Journal of Experimental Psychology: Human Perception and Performance, 31,* 195-215.

Fujimori, T., & Masuta, A. (1997). *Architecture Detective, Rain or Shine*. Asahi Library.

Garling, T., & Evans, G. W. (1991) *Environment, Cognition, and Action.* New York: Oxford University Press.

Gela, B. French railway new geography. *tome II*, 25. Retrieved 2013

Golledge, R., & Go¨rling, T. (2004). Cognitive maps and urban travel. In D. Henscher, K. Button, K. Haynes, & P. Stopher (Eds.), *Handbook of transport geography and spatial systems, 28,* 501– 512. Amsterdam: Elsevier.

Google (2011). *Sketch Up Pro 8.* Mountain View, CA: Google.

Grinczel, Steve. (2003). *They Are Spartans*. Charleston, South Carolina: Arcadia Publishing. p. 9.

Hauser, S. (2005). Kulturlandschaft und Identita¨t, in: Bundesministerium fu¨r Verkehr, Bau- und Wohnungswesen (Eds). *Future Landscapes*, 26.

Henry A. D., & Dietz T. (2012) Understanding Environmental Cognition. *Organization & Environment, 25*, 238-258.

Heth, C. D., & Cornell, E. H. (1998) Characteristics of travel by persons lost in Albertan wilderness areas. *Journal of Environmental Psychology, 17,* 199-213.

Hidayetoglu, M., Yildirim, K., & Akalin, A. (2012). The effects of color and light on indoor wayfinding and the evaluation of the perceived environment. *Journal of Environmental Psychology, 32,* 50–58.

Hiroko, N. (2012, December 23). Tokyo Station's Marunouchi side restored to 1914 glory. *Japan Times*, 3.

Hochmair, H., & Karlsson, V. (2005). Investigation of preference between the least-angle strategy and the initial segment strategy for route selection in unknown environments. In C. Freksa, M. Knauff, B. Krieg-Brckner, B. Nebel, & T. Barkowsky (Eds.), *Spatial cognition IV: Reasoning, action, interaction* (Vol. 3343, pp. 79–97). Berlin: Springer.

Hull IV R. B., Lamb M., &Vigob G. (1993). Place identity: symbols of self in the urban fabric. *Landscape and Urban Planning, 28,* 109-120.

Hunt, M. E. (1984) Environmental Learning without being there. *Environment and Behavior, 16,* 307-334.

JR East Japan Railway Company (2013). Tokyo Station. In *JR East Japan Railway Company*. Retrieved 2013

Kato, Y., & Takeuchi, Y. (2003). Individual differences in wayfinding strategies. *Journal of Environmental Psychology, 23,* 171–188.

Kimes, B. R., & Langworth, R. M. (1972). *Oldsmobile; the first seventy five years*. New York: Automobile Quarterly.

Levine, M. (1982) You-are-here maps: Psychological considerations. Environment and *Behavior, 14,* 221-237.

Levine, M., Marchon, I., & Hanley, G. (1984). The placement and misplacement of you-are-here maps. *Environment and Behavior, 16,* 139-157.

Library of Michigan (2011). *Michigan in Brief, Information about the State of Michigan*. Retrieved 2013

Lin, J.J. & Gau, C.C. (2006). A TOD planning model to review the regulation of allowable development densities around subway stations. *Land Use Policy 23,* 353–360.

Litman, T. A. (2012). *Evaluating Accessibility for Transportation Planning Measuring People's Ability To Reach Desired Goods and Activities*. N.p.: Victoria Transport Policy Institute. Retrieved 2013

Long, K. (2012, March 14). All change at King's Cross. *London Evening Standard*, 34.

Longshan Temple, Baoan Temple, and Xiahai City God Temple: Taipei's Glorious Heritage-Site Temples (2009, January 12). *Department of Information Technology*.

Lynch, K. (1960). *The image of the city*. Cambridge, MA: M.I.T. Press.

Lynch, K. (1998). *Good city form*. Cambridge, MA: Mass: MIT Press.

Menenti, C. (2011) Sustainability and place identity. *Procedia Engineering 21,* 1104-1109.

Metro Taipei (2013). Longshan Temple Station. In *Metro Taipei*. Retrieved 2013

Michigan State University (2013). The Red Cedar Runs Through Michigan State University. In *MSU ALUMNI*. Retrieved 2013

National Hydrography Dataset high-resolution flowline data (2013). *The National Map*. U.S. Geological Survey. Retrieved 2013

Network Rail unveils look for King's Cross square (2011, August 10). *Rail (Peterborough)*, 14.

Network Rail (2013). King's Cross Station. In *Network Rail*. Retrieved 2013

Nogue, J., & Vicente, J. (2004). Landscape and national identity in Catalonia. *Political Geography 23,* 113–132.

Oswald, T. (2005, August 26). Sparty' Unveiled. *MSU Today*.

Passini, R. (1992) *Wayfinding in Architecture.* New York: Van Nostrand Reinhold.

Peters, R. L. (2005, July). Identity Matters. *Communication Arts magazine*.

Ratner K. A. & Goetz A. R. (2013). The reshaping of land use and urban form in Denver through transit-oriented development. *Cities 30,* 31–46.

Smitshuijzen, E. (2007). *Signage Design Manual*. Baden, Switzerland: Lars Mu ̈ller Publishing.

SNCF (2013). Gare du Nord. In *SNCF*. Retrieved 2013

Stedman, C.R. (2003). "Is it really just a social construction? : The contribution of the physical environment to sense of place", *Society and Natural Resources, 16,* 671-685.

Throndyke, P. W., & Hayes-Roth, B. (1982). Differences in spatial knowledge acquire from maps and navigation. *Cognitive psychology, 14,* 560-589.

Ujang, N. (2009). Place Attachment and Continuity of Urban Place Identity. *Procedia - Social and Behavioral Sciences 49,* 156-167.

Union Station Washington D.C. (2013) Union Station. In *Union Station Washington D.C.* Retrieved 2013

Urban Design Guidelines: California High-Speed Train Project (2011, March). In *California High-Speed Rail Authority*. Retrieved 2013

Wang, C., & Li, S. (2002, December 1). The Folk Buddhism of Lung Shan Temple in Meng-chia Taipei: Its Characteristics and Historical Changes. *Yuan Kuang Buddhist Journal*, *N7*, 135-152.

Wayfinding at stations: A good practice guide (2006, June). In *RSSB*. Retrieved 2013Winkle, L. V. (2003). East Lansing, MI (LNS). Retrieved 2013

Xiong, B. (1996, June 1). Explore the beauty of the temple in Taiwan - Longshan Temple. *Fuxinggang Journal*.

Young, C., & Light, D. (2001). Place, national identity and post-socialist transformations: An introduction. *Political Geography, 20(8),* 941–955.

Yu, W. (2008, December 1). Religion or Tourism? Study of the Tourism Resources in Lungshan Temple. *Leisure studies*, *1*.